IN-HOME THERAPIST USE OF FAMILY INTERVENTION APPROACHES AND TREATMENT OUTCOMES FOR GEOGRAPHICALLY ISOLATED ADOLESCENTS WITH SUBSTANCE USE CHALLENGES

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ABSTRACT

Family-based intervention approaches are efficacious for treating adolescent substance use. Rural, geographically isolated families, who experience unique stressors and tend to value self-sufficiency and independence might be limited in their ability and/or willingness to participate in family-based therapeutic approaches. Furthermore, some evidence suggests rural youth do not experience the same treatment response and have reduced access to services in comparison to urban youth, and that rural providers use fewer evidence-based practices than urban providers. Using a three-level multilevel modeling approach, this study examined whether (1) geographic isolation predicted poorer outcomes for youth with adolescent substance use, (2) family interventions (practices) and family involvement (number of months parent or family was involved in treatment/total number of treatment months) in services predicted better youth response to treatment, and given results from both (1) and (2), if (3) the extent of family interventions and involvement in treatment mediated any relationship between geographic isolation and outcomes directly and after controlling for covariates including child age, ethnicity, impairment at treatment entry, and level of comorbidity. The first six months of clinical and service data for geographically isolated (n = 269) and non-isolated (n = 365) youth receiving in-home treatment that included targeting substance use in the state of Hawai‘i Child and Adolescent Mental Health Division were included in analyses. Contrary to the hypothesis, there was no evidence that average substance use progress ratings were lower in geographically isolated areas. On average, families of geographically isolated youth were involved in treatment more (rather than less) frequently than non-isolated families. Level of family interventions or involvement in treatment did not predict youth improvement. Other post-hoc analyses revealed

that under some conditions, geographically isolated youth showed greater improvement than non-isolated youth. In addition, when family involvement and interventions were examined separately from individual involvement or interventions, more family interventions (practices) was a significant predictor of improvement. While further research is needed, findings suggest geographically isolated youth and their ecologies in Hawai‘i may have protective factors that support their progress during treatment which could distinguish them from youth in rural-based treatment studies elsewhere in the USA.

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List of Abbreviations

AIC……..……..Aikake Information Criteria

ASU…….Adolescent Substance Use

BSFT……Brief Strategic Family Therapy

CAFAS……Child and Adolescent Functional Assessment Scale

CAMHD……...…Child and Adolescent Mental Health Division

CBT……..Cognitive Behavior Therapy

EBFT……....Ecologically Based Family Therapy

EBP……...Evidence-Based Practices

ICC……...….Intra Class Correlation

IIH……...…….Intensive In-Home

FGC……...…….Family Guidance Center

FFT…….Functional Family Therapy

MDFT……..……Multidimensional Family Therapy

MET……Motivational Enhancement Therapy

MI……....Motivational Interviewing

MLM…….Multilevel Modeling

MST……..Multisystemic Therapy

MTPS…….……..Monthly Treatment Progress Summary

OOH……..…Out-of-Home

PDE……Practices Derived from the Evidence-Base

SES…….Socioeconomic Status

SUD……..…Substance Use Disorder

TAU……Treatment as Usual

UC-FT……...Usual Care Family Therapy

INTRODUCTION

The state of Hawai‘i consists of eight major inhabited islands and offers a unique opportunity to examine the role of geographic isolation and youth mental health services. Hawai‘i has approximately 1.5 million residents with the majority residing in the City and County of Honolulu, O‘ahu (998,714 residents), followed next by Hawai‘i County (196,428), Maui County (164,726; which includes the islands Maui, Moloka‘i,[1] Lāna‘i, and Kaho‘olawe), and Kaua‘i County (71,735; which includes the islands Kaua‘i and Ni‘ihau; U.S. Census Bureau, 2015). Each island within the Hawai‘i archipelago is often described as having a distinct identity with unique cultural norms. For example, the owners of Ni‘ihau, a private island within Kaua‘i County,[2] have only allowed a limited number of visits to the island over the years that include a few invited guests, physicians, and public officials (Tava & Keale, 1984/2006). This privacy has reduced the pressure to assimilate to western culture and practices and has allowed residents to maintain a traditional Hawaiian lifestyle, such as the teaching method *tēnā* and speaking a distinct dialect of Hawaiian (Beniamina, 2010). Kaua‘i, the last of the independent Hawaiian kingdoms to be unified under Kamehameha I (Kame‘eleihiwa, 1992), was described by Werner and Smith (2001) as having an independence reflected in the spirit of its people. Nicknames used to describe each island (e.g., O‘ahu, “the gathering place”; Maui, “the valley isle”; Lāna‘i, “the pineapple isle”; Kaho‘olawe, “the target isle”; Hawai‘i, “the big island”) also reflect their diverse history and landscape. The uniqueness of the islands has been perpetuated by tourist branding, as the Hawai‘i Tourism Authority and its contractors differentiate islands by focusing

[1] Includes Kalawao County
[2] Ni‘ihau is owned by the Robinson family, descendants of the Sinclairs, who originally purchased the island in 1864.

on “distinct experiences and emotional aspects” (Hawai‘i Tourism Authority, 2016). For example, Moloka‘i is branded by the Authority as having open roads, being rich in Hawaiian history and culture, a place to “talk story” with locals, and free of traffic or pollution.

The 2000 Census, Office of Management and Budget, and Rural Urban Commuting Area Codes defined Hawai‘i’s main island, O‘ahu, as urban/metro and all other areas in the state as rural/non-metro (U.S. Census Bureau, 2018). O‘ahu, as the urban core, houses the majority of the state’s health service resources. Given the unique geographic features of Hawai‘i and the distinctiveness of each of the Hawaiian Islands, it is important to explore the role of geographic isolation (i.e., physical separation by water from the urban core of the state) on youth mental health treatment. Geographic isolation will be defined by county, with all non-O‘ahu counties identified as geographically isolated.[3]

Rural Life in Context

Rural America can no longer be characterized as resistant to problems associated with urban living. Factors considered characteristic to rural communities, such as strong social bonds, geographic isolation, and a higher socioeconomic status (SES), were thought to serve as buffers against problematic behavior (Martino, Ellickson, & McCaffrey, 2007; Wilson & Donnermeyer, 2006). Social disorganization theory suggests communities without strong social bonds are less able to discourage inappropriate conduct (Sampson & Groves, 1989). Urban communities were thought to lack secure social networks, including having weaker family involvement and insufficient bonds between individuals and social institutions (e.g., family, school, church) which

[3] As this study includes data from years that the island O‘ahu was considered as the only urban area in Hawai‘i by most definitions, O‘ahu will be considered as urban, with all other areas as rural, though the term geographic isolation will be used to reflect the isolated nature of the island state.

limited the ability to deter youth from engaging in harmful activities, such as substance use. In contrast, rural community factors such as limited population size, higher SES, higher family cohesion, stronger social control, positive peer groups, and individuals with stable residence over time were believed to buffer against negative or undesirable outcomes (Dew, Elifson, & Dozier, 2007; Martino et al., 2008).

Economic, social, and environmental changes to rural areas have led to the erosion of factors once thought to be protective in those communities and have resulted in increased stress for rural residents (Bolin et al., 2015). The economic conditions in rural communities have changed drastically, following the decline of the agriculture, manufacturing, and mining industries, resulting in high rates of poverty (Dew et al., 2007). Rural areas, often dependent on a single industry base, take hard hits during economic declines and have more difficulty recovering afterwards, which has implications for the quality of life and mental health of rural residents (Hertz, 2016; O'Hare, 2009; Wagenfeld, 2003). Since the national economic downturn and recession in 2008, urban and suburban areas have returned to prerecession employment rates, but rural/non-metro areas have not (Hertz, 2016). Findings from the 2014 U.S. Census Bureau American Community Survey indicate rural residents experience higher rates of poverty than their urban counterparts across age groups, racial/ethnic categories, and family type (Farrigan, Hertz, & Parker, 2015). Of particular concern is higher childhood poverty rates, with an estimated 23.5% of children under age 18 from nonmetropolitan areas living in poverty, compared to 18.8% of children from metropolitan areas (Farrigan et al., 2018). Residents in rural areas also have limited access to educational opportunities and are less likely to receive secondary and post-high education compared to urban residents (Erwin et al., 2010). From 2000

to 2013, the percentage of adults between ages 25 and 34 with a bachelor's degree rose from 29% to 35% in metro areas, but grew from just 15% to 19% in non-metro areas (Marré, 2016).

Along with limited educational opportunities and high poverty rates, rural residents face significant challenges related to employment opportunities. Rural areas have fewer high quality jobs with adequate pay and benefits, and residents who are employed often take multiple jobs, travel long distances for work, have non-traditional work shifts, and have seasonal and/or temporary employment (Lim, Follansbee-Junger, Crawford, & Janicke, 2011; O'hare, 2009). Risk for on-the-job injury is considerably higher for rural residents, including increased mortality and morbidity related to injuries associated with rural jobs (Bolin et al., 2015; Peek-Asa, Zwerling, & Stallones, 2004).

In the past, geographic isolation helped to shelter rural places from negative influences of urban life, such as the availability of illicit substances (Martino et al., 2008; O'Dea, Murphy, & Balzer, 1997). However, the expansion of interstate highway systems on the continental U.S. has created additional means of illicit drug production and distribution (Dew et al., 2007). Additionally, increased internet access in rural areas might also be related to both increased substance availability and use. Rural residents are able to purchase substances over the internet, view recipes for production (e.g., methamphetamine), and are exposed to marketing ads about substances on various websites (Dew et al., 2007; Van Gundy, 2006).

Hallmarks of traditional rural family structure included few changes in household composition, high cohesion, and interdependent socialization patterns, which were considered to protect rural families against adolescent conduct challenges (Dew et al., 2007). However, rural families have faced increased stressors parallel to the drastic changes to rural economies and

high rates of poverty (Celluci, Vik, & Nirenberg, 2003). Rural families experience high rates of divorce, unemployment, single parenthood, and an increasing number of mothers entering the workforce (McGranahan, 2003). It has been suggested that the stress in family homes is related to increases in parental depression, anxiety, substance use, and domestic violence (Dew et al., 2007).

Rural families might also experience a greater impact from mental health concerns than urban families due to challenges with accessibility, availability, and acceptability of mental health care (U.S. Department of Health and Human Services, 2005; Human & Wasem, 1991). Central to the issue of accessibility is being able to get to and from services and to pay for them. Public transportation is still limited in some rural communities, which might make it difficult for families to travel to care (Pullman, VanHooser, Hoffman, & Heflinger, 2010). Threats to economic security might make it more difficult for parents to take time off work to attend treatment sessions or monitor their children (Dew et al., 2007; Matsuoka & Benson, 1996). Rural areas have fewer available specialty services. For example, an examination of data from the 2004 National Survey of Substance Abuse Treatment Services found that only 8.9% of treatment facilities were in rural counties (Lenardson & Gale, 2007). While efforts have been made to address the shortage of mental health providers in rural areas (e.g., federal loan repayment programs), these have not evolved as quickly as rural population increases and many rural places remain designated as mental health professional shortage areas (U.S. Department of Health and Human Services, 2005; Jameson & Blank, 2007; Jameson, Blank, & Chambless, 2009).

Parr and Philo (2003) conceptualized communities in terms of population density and proximity. Urban settings are described as physically proximate but socially distant and rural settings as socially proximate but physically distant. The social proximity of rural communities suggests rural residents with mental health concerns and parents of children with these challenges might fear being able to access care anonymously (Larson, Corrigan, & Cothran, 2012). For example, when most community members know which agencies and individuals provide mental health services it can be a challenge to keep others from knowing about the use of services (Jameson & Blank, 2007). A qualitative study with rural mental health providers and family caregivers identified several themes related to the barriers and supports for participation in services within a rural system of care. These included the experience of stigma about mental health and mental health services, a close-knit community that both facilitated and was a barrier to services, and a lack of mental health knowledge within the community, which contributed to stigma, a reluctance to ask for help, and a misunderstanding about the services provided (Pullman et al., 2010).

Historically, families have functioned as the source of behavioral health care for children and the gatekeeper to obtaining formal services (Heflinger & Christens, 2006). Families' attitudes about help seeking, the value of self-reliance, stoic attitudes towards mental health and its treatment, preference for informal support from peers or church, concerns about stigma or being able to access care anonymously, and a mistrust of professionals might deter rural residents from seeking out treatment services for youth (Dew et al., 2007; Heflinger & Christens, 2006; Larson et al., 2012; Murry, Heflinger, Suiter, & Brody, 2011; Pullman et al., 2010). Due to challenges related to accessibility, acceptability, and availability, rural residents tend to enter

care later, with more severe symptoms and when their mental health difficulties have persisted over longer time periods (Rost, Fortney, Fischer, & Smith, 2002).

Geographic Isolation in Hawai‘i

Geographically isolated families in Hawai‘i experience many stressors similar to those faced by rural families in the continental United States. After more than a century of sugar and pineapple plantation agriculture as the major economic driver in the state, the shift to a tourism-based economy has resulted in many social changes. Matsuoka & Benson (1996) conducted a mixed-methods study to examine family cohesion and mental health symptoms following the phase-out of pineapple production and the introduction of a resort development on Lāna‘i in the mid-1980s. They found that participants who reported low family cohesion and low family adaptability reported more mental health problems, including higher levels of somatization, interpersonal sensitivity, depression, anxiety, and psychoticism. Findings from focus group discussions suggested parents who transitioned from plantation to resort employment needed to adjust to an unpredictable and sometimes sporadic work schedule (including weekend work) that was highly dependent on the economic fluctuations associated with tourist season (Matsuoka & Benson, 1996). These changes were hypothesized to increase family stress, decrease parental supervision, and increase youth engagement in antisocial and substance use behaviors.

Consistent with patterns observed nationwide, rural counties in Hawai‘i experience more economic challenges than Honolulu County. In comparison to state averages, non-O‘ahu counties have a lower median household income, lower income per capita, a larger number of families living below the poverty line, more children living in poverty, higher rates of unemployment, fewer individuals with bachelor’s degrees, and longer commute times to jobs in

more centralized areas (Department of Business, Economic Development, & Tourism [DBEDT], 2015; SMS, 2010). In 2014, 25.3% of children in Hawai‘i County, 17.3% of children in Maui County, and 15.1% of children in Kaua‘i County were living in poverty, compared with 12.8% of children in Honolulu County (DBEDT, 2015). There is also some evidence to suggest rural areas experience greater family stress and social concerns related to low economic conditions. For example, Breiding, Ziembroski, & Black (2009) found women in rural Hawai‘i reported significantly higher lifetime intimate partner violence rates than those in non-rural areas.

Hawai‘i’s unique geography, which spans a distance of 400 miles from Ni‘ihau to Hawai‘i Island and consists of islands separated by ocean (and, in the case of Hawai‘i Island, topography that includes active volcanos) significantly influences health service delivery. Residents in non-O‘ahu counties experience more barriers accessing services, as the majority of physicians, psychologists, hospitals, and other health resources are located in the urban center of the state and it can be expensive and time consuming for families who must fly to O‘ahu for specialty care (Healthy Communities Institute, 2013; Oliveira et al., 2006; Whealin et al., 2014). There are also fewer licensed clinical psychologists and licensed clinical social workers per capita in non-O‘ahu counties as compared with O‘ahu (Department of Commerce and Consumer Affairs [DCCA] Hawai‘i, 2016).

The lack of services available in a youth’s home community may contribute to higher out-of-home treatment placements for rural youth. An examination of service use patterns and health care disparities within the Hawai‘i youth mental health system of care found that rural youth had greater psychosocial impairment at intake, were more likely to be placed in out-of-home (OOH) services, receive only OOH care, have longer OOH stays, and were less likely to

receive follow-up care than their non-rural youth (Heflinger, Shaw, Higa-McMillan, Lunn, & Brannan, 2015). Furthermore, an examination of the role of geographic isolation on out-of-home placement rates and the availability of service providers in the same system of care found that the more geographically isolated Hawaiian Islands had a greater reliance on OOH placement, fewer in-home providers, and significantly less doctorate level providers than the mostly urban island of O'ahu (Hee, Milette-Winfree, Wilkie, & Mueller, 2015).

Adolescent Substance Use

Adolescent substance use (ASU) is of concern due to its considerable short- and long-term consequences and societal cost. In 2014, an estimated 1.3 million United States adolescents (approximately 5%) displayed levels of substance use consistent with DSM-IV-TR criteria for a substance use disorder (SAMSHA, 2015a). The National Comorbidity Survey Replication – Adolescent Supplement (NCS-A), which estimated lifetime prevalence of DSM-IV-TR mental disorders, found substance use was the fourth most commonly reported psychiatric condition (11.4%), occurring more frequently in males, and increasing with age (Merikangas et al., 2010). Furthermore, findings from the 2015 Monitoring the Future study indicated 39% of 12th graders, 28% of 10th graders, and 15% of 8th graders had used an illicit substance within the past year (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2016).

A substance use disorder (SUD) is characterized by tolerance (needing larger amounts of a substance in order to become intoxicated or experiencing reduced effects from a consistent level of consumption); withdrawal (cognitive and physiological changes when a substance is stopped); craving (a powerful urge or desire to use the substance); taking the substance in larger amounts or over longer times than intended; giving up important activities due to use;

unsuccessful attempts to quit or cut down on use; spending considerable time obtaining, using, or recovering from the substance; continuing to use the substance despite physical, psychological, social, or interpersonal impacts; failing to meet important obligations at home or school/work due to use; and use in dangerous situations (American Psychiatric Association [APA], 2013). It is possible that the DSM criteria (both from DSM-5 and prior editions), which apply the same symptoms to adults and youth, might not adequately capture substance use challenges in adolescents. Studies using DSM-IV and/or DSM-IV-TR diagnostic criteria have identified a group of "diagnostic orphans" who endorse one or two symptoms of a substance use disorder but do not meet the full criteria for diagnosis, despite problematic use (Chassin, Bountress, Haller, & Wang, 2014). As such, diagnostic prevalence estimates might underestimate youth use-related challenges and need for services.

The high prevalence of ASU is of particular concern given that it is associated with a number of short- and long-term consequences. ASU influences one's judgment and performance, and even a sole episode of heavy drinking has been associated with a risk for morbidity and mortality due to accidents, impaired driving, and risky sexual behavior (U.S. Department of Health and Human Services, 2007). Other associated features of ASU include poor academic performance, reduced likelihood of completing high school or college, job instability, teen pregnancy, crime, motor vehicle crashes, and poor health (Chassin, Hussong, & Beltran, 2009; Delaney et al., 2001; Moss, Chen, & Yi, 2014; Ozechowski & Waldron, 2010). The presence of a SUD during adolescence increases the risk for later criminal activity and the development of a SUD or internalizing mental health challenge during adulthood (Copeland, Shanahan, Costello, & Angold, 2009; McLaughlin et al., 2010; Trim, Meehan, King, & Chassin,

2007). Total substance use-related costs for federal, state, and local governments are estimated at more than $468 billion per year with an additional $14.4 billion for substance-related juvenile justice programs alone (National Center on Addiction and Substance Abuse at Columbia University, 2011).

Rural Adolescent Substance Use

ASU was once characterized as primarily an urban problem (Martino et al., 2008). However, rates of substance use in rural areas are equal to, and in some places higher than, those in urban areas (Curtis, Waters, & Brindis, 2011; Gfroerer, & Colliver, 2007; Lambert, Gale, & Hartley, 2008). Findings from the 2002-2004 National Survey on Drug Use and Health found rural youth ages 12 to 17 reported higher rates of alcohol, methamphetamine, cocaine, OxyContin, and inhalant use than urban youth. Smaller rural communities reported the greatest rate of alcohol and methamphetamine use, and marijuana and cocaine use was greatest in youth from large rural and rural-adjacent areas (Gfroerer et al., 2007; Lambert et al., 2008).

Rural ASU has been associated with an earlier age of onset than seen with urban youth, placing youth at increased risk for substance abuse or dependence in adulthood (Chassin et al., 2014; Gfroerer, Wu, & Penn, 2002; Gill, Wagner, & Tubman, 2004; Hallfors & Van Dorn, 2002). Rural youth are also more likely than urban youth to engage in high-risk behavior related to substance use. Lambert et al. (2008) found rural youth reported higher rates of binge-drinking (having ≥ 5 drinks on a single occasion within the past month) and heavy drinking (binge-drinking ≥ 5 times within the past month), and were more likely to have driven under the influence of alcohol or illicit drugs than urban youth. The reported high-risk behaviors in rural

adolescents are particularly concerning as they place rural youth in jeopardy not only for continued substance use, but also substance-related injuries.

Rural-Urban Substance Use Differences in Hawai‘i

Rates of substance use in Hawai‘i are comparable to or higher than the nationwide average, with rural counties experiencing a higher rate of ASU in comparison to O‘ahu. Compared with the U.S. average, a greater percentage of Hawai‘i youth ages 12-17 report using an illicit drug or marijuana in the past month or year, met DSM-IV criteria for abuse or dependence of alcohol and/or an illicit drug, and engaged in non-medical use of pain relievers (SAMSHA, 2015b).

Rates of use are different among counties, with non-O‘ahu adolescents reporting higher rates of substance use than those on O‘ahu. Youth ages 12 through 17 residing in non-O‘ahu counties reported higher rates of illicit drug, marijuana, alcohol, and tobacco use, nonmedical use of prescription pain relievers, and binge drinking than O‘ahu youth. In addition, non-O‘ahu youth also reported a lower perceived risk from smoking marijuana or binge drinking, and a larger percentage of these youth initiated early marijuana use in comparison to youth on O‘ahu (SAMSHA, 2015b). Findings from the 2015 Hawai‘i Youth Risk Behavior Survey indicate a higher percentage of high school students residing in non-O‘ahu counties report lifetime use of cocaine, ecstasy, methamphetamine, hallucinogens (e.g., LSD, acid, PCP, angel dust, mescaline, or mushrooms), heroin, and past-month use of marijuana and alcohol, compared with youth on O‘ahu (Hawai‘i Health Data Warehouse, 2016). In addition, a larger percentage of youth in non-O‘ahu counties reported past-month binge drinking and a greater number of youth residing on O‘ahu reported they had “never used any illicit drugs” (Hawai‘i Health Data Warehouse, 2016).

Studies examining adolescent substance use in rural, primarily Native Hawaiian adolescents in Hawai‘i have found families play an influential role in youths’ choice to use or abstain from substances and suggest family members should participate in substance use interventions (Carlton et al., 2006; Okamoto, Helm, Po‘a-Kekauwela, Chin, & Nebre, 2009). While family members might play an important role in youth treatment for ASU, it is unclear how geographic isolation relates to the extent to which families are routinely engaged for these concerns.

Outpatient Treatment for Adolescent Substance Use

Efficacy studies. Studies have found that the application of family focused treatment techniques (e.g., Hogue, Liddle, Dauber, & Samuolis, 2004; Hogue et al., 2015) and parent and/or family engagement (McGarvey et al., 2014) in treatment services are related to improvement in outcomes for youth with substance use challenges. Literature reviews of evidence-based therapies have been conducted with the goal of identifying effective treatment approaches and organizing them according to their level of empirical support (Chorpita et al., 2011; Hogue, Henderson, Ozechowski, & Robbins, 2014; Waldron & Turner, 2008). Treatments were considered “Well-Established” or to have “Best Support” if they included at least two well-conducted group-design studies by different investigators and showed the treatment to be superior to a placebo or alternative treatment, or as effective as an already-established treatment. In their review of evidence for outpatient treatment models for adolescent substance use, Waldron & Turner (2008) examined findings from 17 studies between 1998 and 2007. Using the aforementioned criteria, multidimensional family therapy, functional family therapy, and group cognitive behavior therapy (CBT) emerged as “Well-established” interventions for ASU. These

approaches had effect sizes ranging from 0.34 to 1.28 from baseline to post-treatment follow-up (typically about 3 months after treatment initiation).

Hogue, Henderson, et al. (2014) used a five-level strength of evidence system to examine 19 studies for ASU treatment published between 2008 and 2013, with the highest level of support assigned to "Well-Established Treatments." These authors examined the strength of evidence at the level of treatment type or approach (e.g., ecological Family Based Treatment [FBT-E]) and not the treatment brand (e.g., multidimensional family therapy, functional family therapy). Ecological family-based treatment, group CBT, and individual CBT were deemed "Well-Established Treatments". However, when compared directly with FBT-E, individual CBT was inferior to FBT-E in more than one trial (Hogue, Henderson, et al., 2014).

An analysis of randomized controlled trials for adolescent substance use in 2016 found "Best Support" for a handful of treatment types (Practicewise, LLC, 2016a). These treatment types included family therapy (appearing in 34% of protocols), motivational interviewing/engagement (25%), cognitive behavior therapy (21%), community reinforcement (13%), and contingency management (9%; Practicewise, LLC, 2016b). Many manualized protocols have been developed and tested within each of these treatment groups, and protocols within the family therapy treatment type include Functional Family Therapy (FFT; Alexander, Waldron, Robbins, & Neeb, 2013), Brief Strategic Family Therapy (BSFT; Szapocznik, Hervis, & Schwartz, 2003), Multisystemic Therapy (MST; Henggeler & Borduin, 1990), Ecologically Based Family Therapy (EBFT; Slesnick & Prestopnik, 2005), and Multidimensional Family Therapy (MDFT; Liddle, 2002).

Effectiveness studies. There has been a shift in ASU treatment research from efficacy studies conducted under highly controlled conditions to effectiveness trials, which examine interventions transported into community clinical settings. In effectiveness studies, it is likely that the treatment developer is not providing direct clinical supervision, treatment is provided by community therapists, clients with comorbid concerns are included, and therapists are employees of community organizations (Henggeler & Sheidow, 2012). The majority of effectiveness studies for ASU treatment have been conducted using hybrid part-efficacy, part-effectiveness designs. These hybrid studies balance elements of effectiveness trials such as having few participant exclusion criteria, including clients with comorbid concerns, and using community therapists to deliver manualized interventions with aspects of efficacy studies such as rigorous therapist training, supervision, and fidelity procedures (Henggeler & Sheidow, 2012).

Hybrid effectiveness studies comparing family based therapy to another evidence-based approach or treatment as usual (TAU) have shown that community therapists can be trained to implement these treatments, that they successfully engage and retain families in treatment, and that they effectively address youth substance challenges. Liddle and colleagues (2009) compared MDFT to group CBT for adolescents receiving outpatient treatment for substance use and found MDFT was superior in reducing substance problems and frequency. A study comparing MDFT to individualized CBT in the Netherlands found MDFT was superior at reducing cannabis use in a more severe subgroup but found no difference in treatment effects in the overall sample (Hendriks, van der Schee, & Blanken, 2011). In comparison to TAU, MDFT was superior for treating cannabis-using adolescents in outpatient settings in five European countries (Rigter et al., 2013).

Robbins and colleagues (2011) compared the effectiveness of brief strategic family therapy (BSFT) to TAU provided in eight community-based substance treatment programs for adolescents. While no differences were found in the growth trajectories of self-reported substance use, participants in the BSFT condition had a significantly reduced median number of days of self-reported drug use at the 12-month follow-up, compared with TAU. In addition, BSFT was significantly more effective than TAU in engaging and retaining family members in treatment and in improving parent-reported family functioning. Similarly, hybrid studies of multisystemic therapy (MST) have found the approach to be effective at reducing out-of-home placement and substance use at a 6-month follow up (Henggeler, Pickrel, & Brondino, 1999), substance use at one year (Henggeler et al., 2006), and marijuana use at a four-year follow-up (Henggeler, Clingempeel, Brondino, & Pickerel, 2002).

Baer and colleagues (2007) compared a four-session individual Motivational Interviewing (MI) protocol to TAU for youth recruited from a homeless shelter and found no differences in substance use outcomes between groups. In another study, two-session group MI was tested against a no-intervention control group for alcohol users in school, however, there were no differences in substance use outcomes between conditions (Gmel, Venzin, Marmet, Danko, & Labhart, 2012). In a comparison of two sessions of Motivational Enhancement Therapy followed by three sessions of group cognitive behavior therapy (MET/CBT-5) to TAU, using matched-group archival data from two national effectiveness studies, MET/CBT-5 was superior for substance use outcomes (Hunter et al., 2012). Taken together, these findings suggest family-based protocols are likely effective at treating youth substance challenges, and that while

MI might be an effective precursor to another intervention, it does not appear sufficient as a standalone approach.

Specific mechanisms purported to contribute to the effectiveness of family therapy approaches for ASU include both behavioral parenting changes and improvement to family interactions, which have been related to reductions in drug and alcohol use and increased prosocial youth behavior (Liddle, 2004; Liddle et al., 2009). Specific parenting strategies associated with reduced ASU include parent modeling, limiting the availability of the substance, disapproval of the ASU, discipline, parent monitoring, quality of the parent-child relationship quality, parental support, and communication (Ryan, Jorm, & Lubman, 2010). In addition to improving parenting behaviors, core family therapy intervention techniques typically include having multiple family therapy members present in treatment sessions, understanding the referral concern though a family-focused lens and developing family-based treatment goals, working to develop in-session change to familial interaction patterns so as restructure problematic relationships, increasing attachment and effective communication between family members, and improving family problem solving (Hogue & Liddle, 2009). Adherence to these core family therapy techniques has been found to reduce problematic youth behavior, including ASU (Hogue & Liddle, 2009; Hogue & Dauber, 2013).

Dissemination and implementation of EBT for ASU. While family approaches have demonstrated considerable efficacy and effectiveness for ASU, the majority of these treatment models are not easily transported to community settings. Barriers to transferring these approaches to TAU settings include lengthy treatment manuals, standardized training procedures, and ongoing quality assurance that includes observation and consultation from model experts

(Henggeler & Sheidow, 2012; Hogue et al., 2015). These implementation procedures support high fidelity of the intervention, and while developers of manualized family therapy approaches have made progress transporting their models through purveyor organizations that contract with host agencies to oversee adoption, this is costly and might not always be feasible in usual care and/or rural settings (Henggeler & Sheidow, 2012).

Research on ASU treatment has attempted to link specific therapy processes within empirically supported approaches to youth treatment outcomes, which helps to understand what aspects of efficacious and/or effective models should be transported from research to community settings. Hogue et al. (2004) examined the degree to which individual and family-focused techniques within CBT and MDFT led to change in ASU. They used a therapist behavior observational rating system to identify the thoroughness and frequency with which individual and family therapy techniques were utilized throughout treatment sessions. They found family-focused, but not adolescent-focused psychotherapeutic approaches predicted post-treatment improvements in substance use and comorbid concerns, and that the benefits of focusing on family content were consistent for youth in both the CBT and MDFT conditions.

Some researchers (e.g., Carroll & Rounsaville, 2006; Chorpita, Becker, & Daleiden, 2007; Garland, Hawley, Brookman-Frazee, & Hurlburt, 2008; Hogue & Liddle, 2009) have suggested the use of a practice element approach to dissemination, focusing on specific treatment strategies common across manuals for similar populations. This approach shifts the focus of dissemination away from specific therapy models and manuals, and toward common elements of empirically supported approaches. Chorpita, Daleiden, and Weisz (2005) developed the Distillation and Matching Model, which divides empirically supported treatment manuals into

common treatment strategies shared by the majority of intervention protocols for a particular problem area. These practice elements derived from the evidence-base (PDE) are defined by Chorpita et al. (2005) as discrete clinical strategies used as part of larger intervention approaches (e.g., manualized treatment for adolescent substance use) that can be explicitly defined using a coding manual, are present within various interventions that can be reliably coded, and are in multiple treatment protocols. The common elements approach to treatment research has the benefit of comparing techniques utilized in usual care to those specified by the evidence-base. An example of a practice element profile for substance use that includes the skills present in 30% or more of protocols examined includes: psychoeducation-child (present in 54% of protocols), motivational enhancement (47%), communication skills (43%), problem solving (43%), family engagement (35%), family therapy (35%), maintenance/relapse prevention (35%), assertiveness training (31%), cognitive (31%), relationship/rapport building (31%), and stimulus control or antecedent management (31%; Practicewise, LLC, 2018).

TAU findings for ASU. While the large majority of research on family therapy for ASU has been done in highly controlled clinical trials or in effectiveness studies that included ample training, supervision, and consultation with experts (Hogue & Dauber, 2013), promising findings have emerged on studies of family-related strategies used in usual care. Hogue and colleagues (2014; 2015) examined whether usual care family therapy (UC-FT) was more effective than nonfamily therapy (UC-Other) when provided as part of routine usual care for inner-city adolescents with conduct or substance problems. Participants in the UC-FT condition received non-manualized family therapy that was provided as the standard of care at a single community clinic. The five sites designated as UC-Other did not provide family-based treatment as a regular

standard of care. Therapist adherence to family therapy treatment techniques was assessed by a therapist self-report adherence measure of CBT, family therapy, motivational interviewing, and drug counseling intervention strategies (Hogue, Dauber, & Henderson, 2014). Therapist fidelity to family therapy techniques were also observed and compared to benchmark MDFT adherence data from a group of former therapists at the UC-FT site. Outcome measures included youth and caregiver report of externalizing and internalizing behavior, youth self-report of overt and covert delinquent acts, and the quantity and frequency of substance use. Adolescents also reported the number of days alcohol or illicit drugs were used in each month of the follow-up period. Youth with substance use challenges who received UC-FT had significantly better abstinence rates between baseline and a one-year follow up (40% abstinent compared with 26% abstinence rates for youth who received UC-Other). Contrary to other studies, UC-FT was not superior to UC-Other in retaining clients.

While findings from Hogue and colleagues (2015) demonstrate superior abstinence rates for UC-FT in comparison to UC-Other, this study was conducted with urban, inner-city participants, and it is unclear whether family therapy approaches are similarly effective for geographically isolated youth whose families might have considerable challenges engaging in treatment. In addition, while the UC-FT site did not import a manualized family therapy model, a family therapy approach was the standard of care, likely left over from a time when this modality was the norm in youth community mental health (Hogue et al., 2015). Arguably, the UC-FT clinicians had a strong allegiance to the family therapy model and might not be representative of typical usual care therapists.

In a study examining the frequency, level, and rate of treatment improvement on therapist-identified treatment targets, Love, Mueller, Tolman, and Powell (2014) found substance use was a focus of treatment for 23.8% of youth receiving in-home usual care services. These authors found that youth achieved the highest level of improvement on the substance use target of treatment after approximately 100 days. This study did not examine therapist practices used during treatment and it is unclear how the use of family-related interventions might relate to youth improvement.

Studies Comparing Substance Use Treatment for Rural and Urban Youth

While research suggests family therapy protocols are efficacious and effective in addressing substance use challenges for youth in urban settings, it is unclear whether established evidence-based practices are similarly effective for geographically isolated families. A study by Dotson et al. (2014) found rural substance abuse agencies reported significantly less use of evidence-based practices (EBP) than urban organizations, but did not examine how EBP use was related to treatment outcomes. Empirical research comparing ASU treatment outcomes for rural and urban youth is limited and has not directly examined differences in outcomes related to treatment type or specific practices used by therapists. Ruiz, Stevens, McKnight, Godley, and Shane (2005) examined differences in youth substance and mental health outcomes for rural and urban youth involved in the juvenile justice system. Youth participants in this study attended either outpatient or residential treatment programs, although the specific treatment approaches used were not described. They found that average substance use change trajectories at three-, six-, 12- and 30-month follow-ups were similar for rural and urban youth, that rural Hispanic

youth had the highest severity of substance use, and that rural youth used substances with less frequency at entry to treatment than those that were urban.

Hall et al. (2008) compared treatment outcomes for rural and urban youth receiving a variety of treatment approaches (e.g., usual care, Motivational Enhancement Therapy/Cognitive Behavioral Treatment, Seven Challenges, or Strengths Oriented Family Therapy). Due to a small number of rural participants (n = 50), this study did not examine interactions between rurality and treatment approach; however, they did compare treatment outcomes between rural and urban youth. Findings indicated rural youth entered treatment with a greater problem severity for substance use and externalizing concerns and that a greater percentage of urban youth achieved abstinence at three-, six-, and 12-month follow ups, though the difference was only significant at the six-month follow up (Hall et al., 2008).

McGarvey and colleagues (2014) compared treatment outcomes for rural and urban youth ages 12-18 with a cannabis use disorder who received the Adolescent Community Reinforcement Approach coupled with Assertive Continuing Care (A-CRA/ACC). This treatment included a 10-session manualized protocol provided individually with two additional sessions delivered to the caregivers, followed by 12 to 14 weeks of continuing care for the adolescent via therapist visits to the home. This study found no significant differences in the reduction of cannabis or alcohol in urban or rural youth. The lack of observable differences in treatment outcomes was attributed to well-trained therapists who were monitored and supervised during treatment (McGarvey et al., 2014).

Summary

Family involvement and the use of family interventions have been shown to be an important element of treatment for ASU. However, efficacy and effectiveness studies have been based on primarily urban, inner-city youth. The stressors and treatment access difficulties that isolated families experience might impede parents' ability to participate in youth mental health treatment, resulting in therapists using fewer family focused strategies to treat geographically isolated youth and thus poorer outcomes for these adolescents compared with non-isolated youth.

Study Setting: The Hawai‘i State Child and Adolescent Mental Health Division

The Hawai‘i State Child and Adolescent Mental Health Division (CAMHD) offers a unique opportunity to examine differences in usual care treatment for geographically isolated adolescent substance users. In CAMHD, youth can be placed in a variety of treatment settings that include in-home (e.g., intensive in-home, Functional Family Therapy, Multisystemic Therapy) and out-of-home (e.g., community-based residential, hospital-based residential, therapeutic foster home) placements (CAMHD, 2012). Treatment services are organized by one or more regional family guidance centers located within each county. Providers statewide report on treatment targets and therapeutic practices using the Monthly Treatment and Progress Summary (CAMHD, 2003; 2005).

Study Aims

The first aim of the current study was to examine how geographic isolation relates to therapeutic progress during the first six months of treatment. Therapist-reported treatment progress ratings on the substance use treatment target were examined using a multilevel predictive model that accounted for covariates related to the client (age, gender, ethnicity,

comorbidity, and impairment at the start of treatment) and therapist (degree, credential code, licensure status). It was hypothesized that geographically isolated youth would experience a slower rate and lower average level of substance use progress rating over their first six treatment months in comparison to non-isolated youth.

The second aim was to determine whether the use of family interventions and family involvement in treatment predict youth outcomes. The number of family interventions used per month and number of individual youth coping skills used per month during the treatment episode were entered as predictors via a multilevel model to explain youth progress during the first six months of treatment. It was hypothesized that family involvement in services (i.e., the average number of months when a parent and/or family member was involved in one or more sessions as reported on the service format of the MTPS) and an increased use of family interventions would lead to a higher level and quicker rate of therapeutic progress for youth and that therapists treating geographically isolated youth would be less likely to use these approaches. It was expected that use of individual youth coping skills would be a smaller or non-significant predictor of youth treatment outcomes.

If the above hypotheses held; the final aim of this study was to examine whether the use of family interventions and family involvement in treatment mediated any relationship between geographic isolation and youth treatment outcomes. It was hypothesized that an increased use of family treatment approaches and family involvement in treatment would mediate any isolated/non-isolated youth outcome differences.

METHOD

Hawai‘i Youth Mental Health System of Care

In the state of Hawai‘i public mental health system of care, services are provided to adolescents and their families through the Department of Education’s school-based programs and by services contracted through the Department of Health (DOH) Child and Adolescent Mental Health Division (CAMHD, 2012). After meeting eligibility criteria for CAMHD services, youth and their families are assigned a care coordinator who assists in treatment management, planning, and coordination (CAMHD, 2012). CAMHD treatment services are delivered by contracted service providers at multiple levels of care ranging from less restrictive (e.g., intensive in-home) to more restrictive (e.g., community-based foster homes, group homes, residential treatment facilities, crisis services) interventions. The sample of youth examined in this study was limited to youth receiving an initial episode of intensive in-home (IIH), the least restrictive level of care provided by CAMHD, which is a non-manualized outpatient treatment approach designed to stabilize and preserve families’ abilities to improve youth functioning in their current living situation as well as prevent the need for placement outside the home (CAMHD, 2012). The reasons for selecting this single level of care include: (1) youth receiving CAMHD services most often receive IIH (Hill, Burgess, Hee, Jackson, & Nakamura, 2014); (2) IIH does not restrict clients on the basis of their diagnosis or a specific set of psychological issues; (3) IIH does not prescribe treatment practices or targets of therapy, unlike some other levels of care that are structured around common treatment goals and therapist practices; and (4) this study’s purpose was to examine family involvement and interventions as applied in routine outpatient settings.

Participant Information

Youth participants. Table 1 provides the demographic information for youth included in this study by geographic isolation and for the total sample. Participants (*N*=634) in the current study consisted of all youth (*n* = 365 non-isolated; *n* = 269 geographically isolated) who (a) received services between 2006 and 2015, (b) completed at least 90 days of intensive in-home treatment, (c) had at least three MTPSs, (d) received at least one substance use treatment target with a corresponding progress rating during the treatment episode, and (e) were between the ages of 11 and 19. Only the first six months of longer-term treatment for clients' initial episode of the intensive in-home level of care in CAMHD that was at least 90 days between July 1, 2006 and June 30, 2016 were included in the analyses. Figure 1 provides more detailed information about sample criteria at various decision points.

Table 1.

Youth demographic and clinical information by geographic isolation and total sample (N = 634)

Variable	Geographically Isolated	Not Isolated	Total Sample
Sample Size[a]	269 (42.4%)	365 (57.5%)	634 (100.0%)
Age	15.98 (1.41)	16.03 (1.31)	16.00 (1.35)
Gender (Male)[a]	158 (58.7%)	255 (69.9%)	413 (65.1%)
Length of IIH Episode (days)[b]	177.00	267.00	219.00
Length of Study Episode (days)	124.33 (23.42)	132.39 (18.02)	128.97 (20.85)
Race[a]	--	--	--
Asian	15 (5.6%)	38 (10.4%)	53 (8.4%)
Black	0 (0%)	3 (0.8%)	3 (0.5%)
Multiracial	160 (59.5%)	211 (57.8%)	372 (58.5%)
Native Hawaiian or Other Pacific Islander	25 (9.3%)	66 (18.1%)	91 (14.4%)
White	45 (16.7%)	29 (7.9%)	74 (11.7%)
Other	1 (0.4%)	2 (0.5%)	3 (0.5%)
Not Available	23 (8.6%)	16 (4.4%)	39 (6.2%)
Primary Diagnosis[a]	--	--	--
Adjustment	24 (8.9%)	15 (4.1%)	39 (6.2%)
Anxiety	20 (7.4%)	21 (5.8%)	41 (6.5%)
Attentional	33 (12.3%)	23 (6.3%)	56 (8.8%)
Deferred	0 (0%)	1 (0.3%)	1 (0.2%)
Disruptive Behavior	94 (34.9%)	165 (45.2%)	259 (40.9%)
Intellectual Disability	1 (0.4%)	0 (0%)	1 (0.2%)
Miscellaneous	7 (2.6%)	4 (1.1%)	11 (1.7%)
Mood	55 (20.4%)	88 (24.1%)	143 (22.6%)
Pervasive Developmental	1 (0.4%)	0 (0%)	1 (0.2%)
Psychotic Spectrum	4 (1.5%)	10 (2.7%)	14 (2.2%)
Substance Related	25 (9.3%)	34 (9.3%)	59 (9.3%)
Missing	5 (1.9%)	4 (1.1%)	9 (1.4%)
Any Diagnosis Present[a]	--	--	--
Adjustment	36 (13.4%)	22 (6.0%)	58 (9.1%)
Anxiety	34 (12.6%)	48 (13.2%)	84 (13.2%)
Attentional	65 (24.2%)	78 (21.4%)	143 (22.6%)
Disruptive Behavior	142 (52.8%)	238 (65.2%)	380 (59.9%)
Intellectual Disability	6 (2.2%)	3 (0.8%)	9 (1.4%)
Miscellaneous	52 (19.3%)	57 (15.6%)	109 (17.2%)
Mood	94 (34.9%)	130 (35.6%)	224 (35.3%)
Pervasive Developmental	2 (0.7%)	0 (0.0%)	2 (0.3%)
Psychotic Spectrum	6 (2.2%)	11 (0.3%)	17 (2.7%)
Substance Related	135 (50.2%)	185 (50.7%)	320 (50.5%)

CAFAS at Episode Start	--	--	--
School	19.07 (9.84)	21.74 (9.93)	20.65 (9.97)
Home	18.50 (9.62)	19.90 (9.07)	19.33 (9.32)
Community	14.67 (8.92)	15.61 (8.97)	15.23 (8.95)
Behavior	16.12 (6.60)	16.13 (7.23)	16.13 (6.97)
Moods	16.03 (6.96)	15.47 (7.49)	15.70 (7.27)
Self-harm	2.01 (6.14)	2.82 (7.22)	2.49 (6.80)
Substance Use	11.82 (10.21)	11.84 (11.01)	11.83 (10.68)
Thinking	1.64 (5.09)	1.97 (5.73)	1.84 (5.47)
Total	99.91 (31.65)	105.31 (34.58)	103.13 (33.51)
Discharge Situation[a]	--	--	--
Foster Home	18 (6.7%)	13 (3.6%)	31 (4.9%)
Group Care	2 (0.7)	4 (1.1%)	6 (0.9%)
Home	104 (38.7%)	135 (37.0%)	239 (37.7%)
Homeless/Shelter	2 (0.7%)	3 (0.8%)	5 (0.8%)
Institution/Hospital	3 (1.1%)	5 (1.4%)	8 (1.3%)
Jail/Correctional Facility	7 (2.6%)	14 (3.8%)	21 (3.3%)
Other	22 (8.2%)	29 (7.9%)	51 (8.0%)
Residential Treatment	17 (6.3%)	28 (7.7%)	45 (7.1%)
Missing	94 (34.9%)	134 (36.7%)	217 (34.2%)
Discharge Status[a]	--	--	--
Success	92 (34.1%)	80 (21.9%)	172 (27.1%)
Insufficient Progress	23 (8.6%)	25 (6.8%)	48 (7.6%)
Family Relocation	3 (1.1%)	5 (1.4%)	8 (1.3%)
Runaway	11 (4.1%)	8 (2.2%)	19 (3.0%)
Refused Treatment	14 (5.2%)	30 (8.2%)	44 (6.9%)
Eligibility Change	6 (2.2%)	25 (6.8%)	31 (4.9%)
Other	41 (15.2%)	71 (19.5%)	112 (17.7%)
Missing	79 (29.4%)	121 (33.2%)	217 (34.2%)

Note. Any Diagnosis Present represents the percent of youth who had a diagnosis in each category anywhere on their diagnostic profile, regardless of order (primary, secondary, tertiary etc.). [a] Represents frequencies and percentages.
[b] Represents median. All other variables represent means and standard deviations

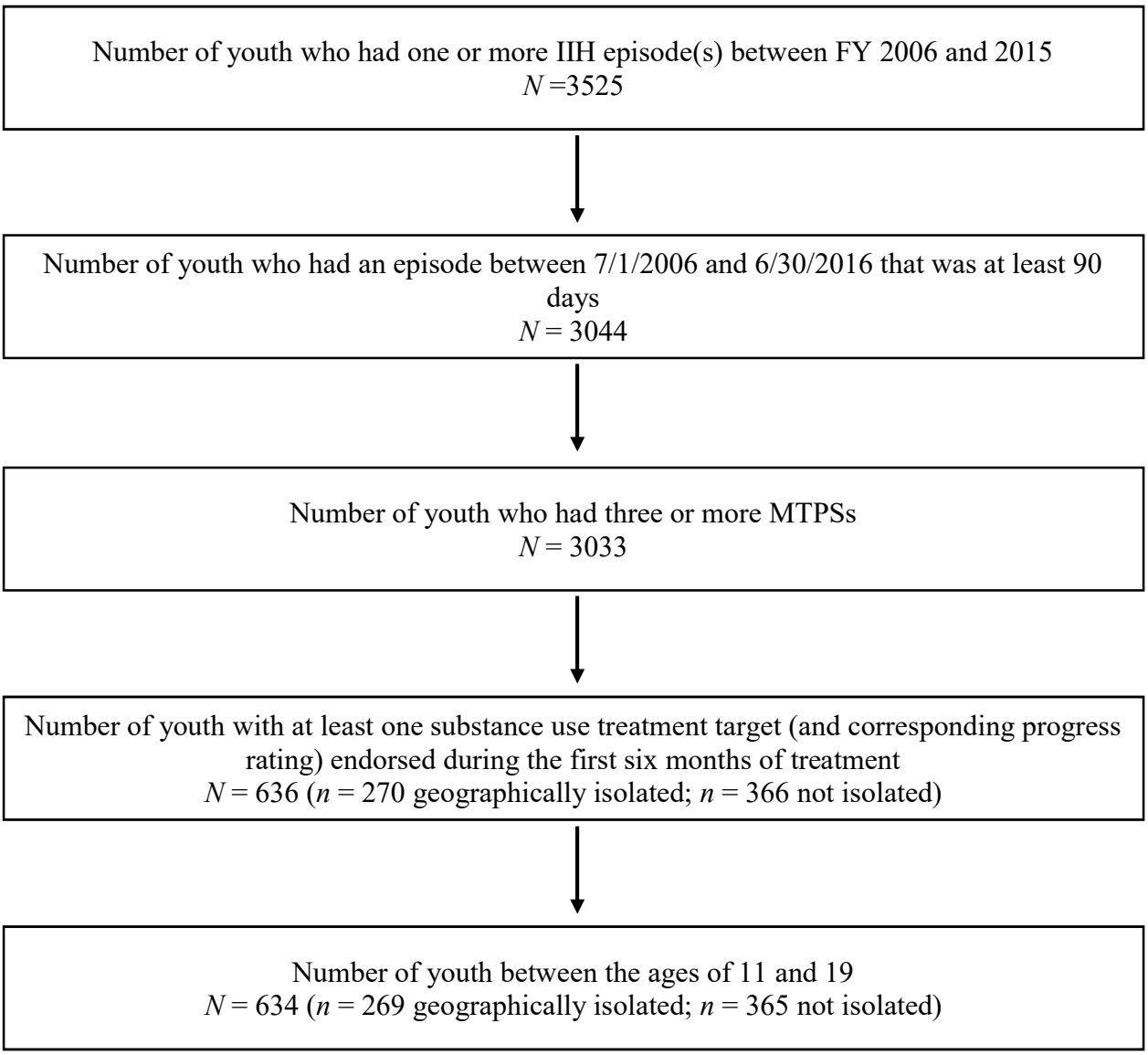


Figure 1. Flow diagram of sample identification and selection among youth receiving Intensive In-Home (IIH) services from the Child and Adolescent Mental Health Division. IIH episodes were limited to after July 1, 2006 due to the completion of MTPSs being required for financial reimbursement after this date.

Therapist participants. Therapist information is provided in Table 2 for the full therapist sample, by geographic isolation category, and by the full sample of clients. There were 201 primary MTPS reporters that provided clinical data on youth in the sample, with an average of 3.15 clients per reporter (634/201 = 3.15). Each youth client had between one and three MTPS reporters, and the primary reporter role was given to the clinician who submitted the greatest number of MTPSs for the client during the six-month study period. If two MTPS reporters submitted an equivalent number of MTPSs for the same client, the primary reporting role was given to the clinician who submitted the first MTPS for the client during the study period. The majority of reporters, hereafter referred to as "clinicians," "providers," or "therapists" were mental health professionals (n = 134, 66.7%) and had obtained master's degrees (n = 182, 90.5%) from preservice training programs including counseling, education, marriage and family therapy, social work, and psychology. While the CAMHD credentialing database used for the current study does not include therapist demographic information (e.g., age, ethnicity, gender), therapist characteristics in the current study are likely similar to those found in prior studies including CAMHD therapists, which have reported therapists as being approximately 75% female, ethnically diverse, and having a mean age of around 40 years old (Nakamura, High-McMillan, Okamura, & Shimabukuro, 2011; Orimoto, High-McMillan, Mueller, & Daleiden, 2012).

Table 2.

Therapist information by geographic isolation and sample size for therapists (N = 201) and corresponding clients (n = 634)

Variable	Geographically Isolated (*n* = 94)	Not Isolated (*n* = 107)	Total Therapist Sample (*N* = 201)	Total Client Sample (*N* = 634)
Highest Degree[a]	--	--	--	--
Associate (AA)/Vocational/ Certificate/Bachelors (BA, BS)	2 (2.1%)	0 (0%)	2 (1.0%)	2 (0.3%)
Masters (MA, MS, MSW, MFT)	89 (94.7%)	93 (86.9%)	182 (90.5%)	590 (93.1%)
Doctor of Psychology (PsyD)	2 (2.1%)	12 (11.2%)	14 (7.0%)	29 (4.6%)
Doctor of Philosophy (PhD)	1 (1.1%)	2 (1.9%)	3 (1.5%)	13 (2.0%)
Professional Specialty[a]	--	--	--	--
Clinical Psychology	2 (2.1%)	15 (14.0%)	17 (8.5%)	38 (6.0%)
Counseling (Education)	3 (3.2%)	3 (2.8%)	6 (3.0%)	18 (2.8%)
Counseling Psychology	21 (22.3%)	32 (29.9%)	53 (26.4%)	161 (25.4%)
Child/Human Development	1 (1.1%)	0 (0%)	1 (.5%)	1 (0.2%)
Education	3 (3.2%)	2 (1.9%)	5 (2.5%)	14 (2.2%)
Marriage and Family Therapy	34 (35.1%)	14 (13.1%)	47 (23.4%)	150 (23.7%)
Nursing	1 (1.1%)	0 (0%)	1 (0.5%)	15 (2.4%)
Other Mental Health-Related Field	4 (4.3%)	0 (0%)	4 (2.0%)	5 (0.8%)
Other Non- Mental Health-Related Field	2 (2.1%)	1 (0.9%)	3 (1.5%)	14 (2.2%)
Psychology	3 (3.2%)	8 (7.5%)	11 (5.5%)	26 (4.1%)
Social Work	19 (20.2%)	31 (29.0%)	50 (24.9%)	176 (27.8%)
Substance Abuse Counseling	1 (1.1%)	0 (0%)	1 (0.5%)	6 (0.9%)
Missing	1 (1.0%)	1 (0.9%)	2 (1.0%)	10 (1.6%)
Level of Licensure[a]	--	--	--	--
Qualified Mental Health Professional	36 (38.3%)	29 (27.1%)	65 (32.3%)	215 (33.9%)
Mental Health Professional	56 (59.6%)	78 (72.9%)	134 (66.7%)	417 (65.7%)
Paraprofessional	2 (2.1%)	0 (0%)	2 (1.0%)	2 (0.3%)

Note. [a] Represents frequencies and percentages. All other variables represent means and standard deviations.

Measures

Monthly Treatment and Progress Summary (MTPS; CAMHD, 2005; Appendix A).

The MTPS is a therapist-report measure designed to monitor ongoing information on service formats, settings, service dates, treatment targets, practice elements, client progress ratings, medications and dosage, reasons for discharge, and discharge living situation. The MTPS allows for both predefined and open-ended responses. Since July 1, 2006, CAMHD-contracted therapists have been required to submit an MTPS for each client on a monthly basis as a condition of service reimbursement (Nakamura, Daleiden, & Mueller, 2007). Due to this requirement, MTPS completion rates are very high. Only 61 MTPSs (1.60% of the total 3804 MTPSs) did not have complete data. Missing MTPS data were defined as a service month within the IIH episode that did not have an MTPS entry in the dataset that was followed by an MTPS submitted the following month. While reasons for missing MTPSs are unknown, it is possible that the therapist failed to submit the MTPS, that it was rejected by the billing department and was thus not considered an "accepted" record, or that no billable service was provided during that month.

CAMHD provides training on completing the MTPS form and definitions of practice elements and has created the Instructions and Codebook for Therapist Monthly Summaries (Appendix B; CAMHD, 2012). In cases where multiple therapists provide services for a client within a month reflected by the MTPS, the therapist that is most familiar with the youth, family, and services provided that month completes the MTPS after consulting with the other therapist(s) (CAMHD, 2012). After completion, a qualified supervisor verifies that information reported is accurate and signs and dates the MTPS. The completed form is sent to the Care Coordinator by

the fifth day of each month. MTPS data are collected statewide and entered in to the Child and Adolescent Mental Health Management Information System (CAMHMIS) through standardized procedures at the Family Guidance Centers. CAMHMIS is a data management system that complies with the standards set by the Health Insurance Portability and Accountability Act (HIPAA). In the current study, approximately 2.20% of cases (84 of the total 3804 MTPSs) had more than one MTPS per month. When this occurred, average scores on progress ratings and all endorsements of treatment targets, practice elements, service formats, and discharge information across the multiple MTPSs for that month were retained to create a single MTPS entry.

Treatment targets and progress ratings. Clinicians indicate up to 10 targets (from a list of 48 predefined and two blank write-in fields) that were the focus of treatment for that month. Then they provide a subjective rating of progress for each individual target selected that describes progress achieved relative to a youth's baseline functioning for that target. Progress ratings are scored on a 7-point scale ranging from 0 to 6 with the following anchors: Deterioration (<0%), No Significant Change (0-10%), Minimal Improvement (11-30%), Some Improvement (31-50%), Moderate Improvement (51-70%), Significant Improvement (71-90%), and Complete Improvement (91-100%). Evidence for the convergent validity of the MTPS treatment targets has been demonstrated with diagnoses related to treatment targets in a predictable way (Daleiden, Lee, & Tolman, 2004; Milette-Winfree & Mueller, 2018). Nakamura and colleagues (2007) found that one-half to two-thirds of target selections were stable from intake to treatment follow-up. In addition, there is evidence for moderate stability in the selection of targets at baseline and after one (k = .66) and three (k = .52) months of treatment (Daleiden, Lee, & Tolman, 2004). An exploratory and confirmatory factor analysis of the

treatment targets yielded evidence for a five-factor structure corresponding to the areas of Disinhibition, Societal Rules Evasion, Social Engagement Deficits, Emotional Distress, and Management of Biodevelopmental Outcomes (Love, Okado, Orimoto, & Mueller, in press).

In terms of progress ratings associated with the treatment targets, Nakamura et al. (2007) found significant correlations between progress ratings on MTPS forms completed by therapists and other measures of clinical functioning completed by different informants. For example, compared with the Child and Adolescent Functional Assessment Scale (Hodges, 1994) completed by care coordinators, where higher scores indicate more impairment, the MTPS therapist progress ratings were significantly negatively correlated (r = -0.22 to -0.44) at one-, three-, and nine-month follow-ups, suggesting convergent validity for the MTPS progress ratings.

Practice elements. Each month, therapists also selected an unconstrained number of practice elements (PEs) used during the month from a list of 63 intervention strategies and three write-in options. An exploratory factor analysis (Orimoto et al., 2012) of the PEs suggested a three factor structure. The PEs were found to organize into three overlapping domains: behavior management (15 PEs), coping/self-control (19 PEs), and family intervention strategies (13 PEs; Orimoto et al., 2012). Factors were found to be correlated (r = 0.46 to 0.52) and to have adequate to good internal reliability (α = 0.81 for behavior management; α = 0.82 for coping and self-control; α = 0.78 for family interventions; Orimoto et al., 2012). PEs have demonstrated adequate clinician-coder inter-rater reliability (ICC ≥ 0.60), good one-month (k = .65 to 0.67) and three-month (k = .50) test-retest stability, and convergent validity between therapist report

and independently coded observations of treatment sessions (Borntrager, Chorpita, Love, & Mueller, 2013; Chorpita et al., 2005; Daleiden et al., 2004; Daleiden et al., 2006).

Service format. Each month therapists select all applicable service formats used during treatment that month from five predefined choices (i.e., individual, group, parent, family, teacher), and one write-in option. The number of months where the parent or family was involved in treatment in one or more sessions/total number of treatment months indicated family involvement.

Discharge information. During the month a client was discharged, therapists report youth discharge living situation from seven predefined choices (e.g., home, residential treatment, institution/hospital) and one write-in option. Therapists also select the reason(s) for discharge from six predefined reasons (e.g., success/goals met, insufficient progress, refuse/withdraw) and one write-in choice. Discharge reason and living situation should be completed for the last MTPS associated with a youth's treatment episode. Preliminary analyses have demonstrated convergent validity of therapist selection of the discharge reason "success/goals" with youth demonstrating clinical and reliable change (i.e., a decrease of 30 or more points on the Child and Adolescent Functional Assessment Scale [CAFAS], and a CAFAS of 70 or less at discharge; D. Jackson, personal communication, September 2, 2016).

Remaining sections of the MTPS. On the MTPS, therapists also report all applicable settings used, note treatment session dates, and list youths' medication information. Service setting options include home, school, community, out-of-home, clinic/office, and one write-in option. Medication information includes psychiatric medications, total daily dose, dose schedule, and descriptions about changes in medication.

Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 2000; Appendix C). The CAFAS is a 200-item therapist-report measure that assesses youth functional impairment. Based on clinical interviews, case managers in CAMHD assign a behavioral descriptor by level of impairment across eight domains of functioning: School Role Performance, Home Role Performance, Community Role Performance, Behavior Toward Others, Mood/Emotions, Mood/Self-Harmful Behavior, Substance Use, and Thinking. Scores for each CAFAS subscale are calculated by scoring the highest level of impairment (i.e., severe = 30, moderate = 20, mild = 10, no/minimal = 0) endorsed within the respective domain. The total CAFAS score is obtained by summing across the eight subscales. Guidelines for interpreting the total score suggest: 0-10 = "None to minimal impairment"; 20-40 = "Likely can be treated on an outpatient basis"; 50-90 = "May need additional services beyond outpatient care"; 100-130 = "Likely needs care which is more intensive than outpatient and/or which includes multiple sources of supportive care"; and 140+ = "Likely needs intensive treatment, the form of which would be shaped by the presence of risk factors and the resources available within the family and the community."

The CAFAS has demonstrated adequate internal consistency across items ($\alpha = 0.63$ to 0.68), with high inter-rater reliability across different respondents ($r = 0.92$ to 0.96) (Hodges, 1995; Hodges & Wong, 1996). Studies examining concurrent validity have found that CAFAS scores are a sensitive estimate of treatment change and are related to intensity of care provided, restrictiveness of living situation, juvenile justice involvement, psychiatric diagnosis, social relationship challenges, school-related issues, and risky behaviors (Hodges & Gust, 1995; Hodges & Wong, 1996; Mueller, Tolman, Higa-McMillan, & Daleiden, 2010; Nakamura et al.,

2007). Youth CAFAS scores at intake have also evidenced predictive relationships with service utilization and cost (Kier, Jackson, Mueller, et al., 2014).

In the current study, a client's baseline total CAFAS score was entered as a covariate. The CAFAS score was considered the baseline if it occurred within 90 days prior to the start of treatment. If the client did not have a CAFAS score within 90 days prior to their episode start date, the score closest to the start date and within 90 days of that start date was considered the baseline. Mean CAFAS administration in this sample occurred within 26.15 days (*SD* = 28.48 days) following the start of treatment, with a range of 28 days before the treatment episode to 90 after the episode began.

Procedures

Data source. The Research Evaluation and Training Program electronically extracted a data-limited data set with youth clinical and demographic data from the CAMHD Child and Adolescent Mental Health Management Information System (CAMHMIS). Clinical documentation of all registered clients within the CAMHD system is recorded and stored by CAMHMIS in accordance with CAMHD's data storage procedures (CAMHD, 2012). Therapist data were electronically extracted from the credentialing database that was developed and is maintained by the Credentialing Office of CAMHD.

Human subjects considerations. Upon entry into CAMHD, youth clients and their legal guardian(s) receive a complete description of CAMHD's Notice of Privacy and Disclosure Procedures. Legal guardians provide written informed consent for the use of data for research purposes (see Appendix D) and are informed that they may revoke their consent at any time. This consent form adheres to the HIPAA and Family Educational Rights and Privacy Act

standards (CAMHD, 2012). This study was submitted to the University of Hawai‘i at Mānoa Office of Research Compliance Human Studies Program Institutional Review Board and received exempt approval (protocol # 2016-31039) since (a) this is an archival study, (b) youth's legal guardians signed the Notice of Privacy Practices, consenting to the use of data for research purposes, and (c) identifying client information was not examined (i.e., the data-limited nature of the dataset).

Data Analytic Strategy

Defining problem area through substance use treatment target/progress rating. As described earlier, therapists complete the MTPS on a monthly basis, indicating the treatment targets addressed for each youth they provided services to during the reporting month. CAMHD youth were included in the study if they had substance use indicated as a target of treatment on the MTPS, with a corresponding substance use progress rating, at least once during the study window. The sample was identified by treatment target and not DSM diagnostic criteria given concerns about the under-identification of substance use disorders in youth (e.g., Chassin et al., 2014; Klontz, Bivens, Michels, & DeLeon, 2015).

Analysis for aim 1: Examine how geographic isolation relates to trajectories of therapeutic progress during the first six months of treatment. To develop the primary predictor of interest, geographic isolation, a dichotomous predictor variable was derived by coding the FGC that coordinated a youth's services. Family guidance centers located in geographically isolated areas, also known as "neighbor islands" (i.e., Kaua‘i, Maui, Hawai‘i FGCs) were coded as 1, and all O‘ahu FGCs (i.e., Windward, Honolulu, Leeward FGCs) were coded as 0.

The rate of change, or slope, of youth progress rating on the MTPS substance use treatment target during the first six months of treatment and average substance use progress rating during the episode served as the criterion variables for this study aim. It was hypothesized that geographically isolated youth would experience a slower rate and lower level of therapeutic progress on the substance use treatment target at six months. This variable was analyzed along with other covariates including client age, gender, ethnicity, functional impairment at the onset of treatment as measured by total CAFAS, and comorbidity to determine whether geographic isolation predicted treatment progress after accounting for these covariates.

In order to include therapist variables in analyses, the string variable field "education" from the credentialing database was recoded into "highest mental-health degree earned" and "professional specialty" variables. Each "education" cell was double coded by an advanced graduate student and a research assistant with codes based in part on the Therapist Background Questionnaire (Nakamura, Higa-McMillian, Okamura, & Shimabukuro, 2011), and by others who have used the database (Orimoto et al. 2013, Love et al., 2014, Wilkie, 2016). In the event of disagreement between coders, two of the three coders consulted until agreement was reached.

Analysis for aim 2: Determine whether use of family interventions and family involvement in treatment predicts youth outcomes. The use of family interventions and, by comparison, youth individual coping skills was examined by developing separate family intervention and individual coping variables based on the exploratory factor analysis completed by Orimoto et al. (2012). Practice elements were included in the family interventions score if they loaded on either the behavior management or family interventions factors (Orimoto et al., 2012), but not the coping and self-control factor (i.e., any practice element that loaded on the

behavior management and/or family interventions factor and the coping and self-control factor was not utilized as part of the family interventions score). Practice elements were included in the individual interventions score if they loaded on the coping and self-control factor (Orimoto et al., 2012), but not either the behavior management or family interventions factors (i.e., any practice element that loaded on the coping and self-control factor and either the behavior management or family interventions factor was not utilized as part of the individual interventions score). Table 3 provides a list of practice elements that were included in the family interventions and individual interventions scores. The family interventions score was defined as the average family interventions utilized per month during the treatment episode. The individual coping skills score was defined as the average number of individual coping skills endorsed per month during the treatment episode. The family intervention score, and similarly, individual coping skills score, was represented by the following equation.

$$\frac{\Sigma \text{ Family interventions used across the episode}}{\text{Number of Months (MTPSs)}}$$

Family involvement in treatment, and for comparison individual involvement in treatment, was also examined as predictor variables. To create a family involvement variable, service format was coded as 1 for parent and/or family and 0 for all other options (e.g., individual, group, teacher, other). Similarly, an individual involvement variable was coded 1 for individual and 0 for all other options (e.g., parent, family, group, teacher, other). Then, the family involvement score (and similarly the individual involvement score) was defined by the

proportion of months a parent and/or family member was indicated in the service format, represented by the following equation.

$$\frac{\Sigma \text{ Months Parent and/or Family Involved}}{\text{Number of Months (MTPSs)}}$$

The rate of change, or slope, of youth progress rating on the MTPS substance use treatment target during the first sixth months of treatment and average substance use progress rating during the episode served as the criterion variables for this analysis.

Table 3.

Practice Elements Included in the Family, Individual, Family PDE, and Individual PDE Scores

Practice Element (PE)	Family Interventions Score	Individual Interventions Score	PDE Family Level 1 Best Support 30%	PDE Individual Level 1 Best Support 30%
Activity Scheduling	X			
Anger Management *				
Assertiveness Training		X		X
Assessment*				
Attending				
Behavioral Contracting				
Behavioral Management*				
Biofeedback or Neurofeedback				
Care Coordination				
Catharsis				
Cognitive		X		X
Commands				
Communication Skills	X		X	
Counseling*				
Crisis Management				
Cultural Training				
Discrete Trial Training				
Educational Support				
Emotional Processing		X		
Exposure		X		
Eye Movement or Tapping				
Family Engagement	X		X	
Family Therapy	X		X	
Free Association				
Functional Analysis	X			
Goal Setting				
Guided Imagery				
Hypnosis				
Ignoring/DRO	X			
Individual Therapy for Caregiver				
Insight Building				
Interpretation				
Juvenile Sex Offender Treatment				
Legal Assistance or Involvement				
Line of Sight Supervision	X			
Maintenance or Relapse Prevention				X
Marital Therapy	X			
Medication or Pharmocotherapy				
Mentoring		X		
Milieu Therapy				

Mindfulness		X		
Modeling	X			
Motivational Interviewing				X
Natural and Logical Consequences	X			
Other*				
Parent Coping				
Parent or Teacher Monitoring	X			
Parent or Teacher Praise	X			
Parenting*				
Peer Pairing				
Personal Safety Skills				
Physical Exercise				
Play Therapy				
Problem Solving				X
Psychoeducation Child	X			X
Psychoeducation Parent	X			
Relationship or Rapport Building				X
Relaxation		X		
Response Cost	X			
Response Prevention		X		
Self Monitoring		X		
Self-Rewards or Self-Praise		X		
Skill Building	X			
Social Skills Training				
Stimulus Control or Antecedent Management		X	X	
Supportive Listening		X		
Tangible Rewards	X			
Therapist Praise or Rewards	X			
Thought Field Therapy				
Time Out	X			
Twelve Step				
Unclear*				
Number of Practice Elements	19	12	4	6

Note: Practice elements included within the Family Interventions and Individual Interventions Scores were from the factor analysis completed by Orimoto et al. (2012). Practice elements included within the PDE Family and PDE Individual scores identified from a Practicewise, LLC data pull dated March 2018. PDE = Practices derived from the Evidence-Base.

Analysis for aim 3: Examine whether the use of family interventions and family involvement in treatment mediate any relationship between geographic isolation and youth treatment outcomes. Family involvement in treatment and family interventions would be examined as a mediator between geographic isolation and youth outcomes. The rate of change, or slope, of youth progress rating on the MTPS substance use treatment target during the first sixth months of treatment and average substance use progress rating during the episode would serve as the criterion variables for this study aim.

Data preparation. First, minimum and maximum values (i.e., response ranges) for each item, subscale, and total of all measures were calculated to identify any impossible values and potential data entry errors. MTPSs were inspected to ensure that each included had at least one substance use treatment target, respective progress ratings for that treatment target, and at least one PE. Previous studies indicate that the majority of MTPS records are considered valid using these criteria (e.g., Love et al., 2010). Second, to acquire a preliminary and broad understanding of the data, the means, standard deviations, skewness, and kurtosis of relevant variables were examined. Last, assumptions for conducting multilevel modeling (MLM) analyses were tested (e.g., sufficient variance in the criterion variable, normal distribution of residuals for the criterion variable, and non-multicollinear predictors; Quene & van den Bergh, 2004; Raudenbush & Byrk, 2002).

Missing data. As described below, MLM was the major analytic strategy for this study. MLM allows for participants within a study to have incomplete or unequal amounts of data for each participant (Quene & van den Bergh, 2004; Raudenbush & Byrk, 2002). Given this, it is not necessary for listwise deletion to occur if participants have missing data or unequal time

points. However, MLM assumes that data missing in the sample are missing at random (MAR; Quene & van den Bergh, 2004; Raudenbush & Byrk, 2002). Thus, a Missing Values Analysis was run in the Statistical Package for Social Sciences to determine if the data were Missing Completely at Random, Missing at Random, or Missing Not at Random (Little & Rubin, 1987).

Consistent with previous studies using CAMHD data, CAFAS data were missing from the dataset at a high rate. In addition, there was a break in CAFAS data entry in October 2014 due to contract renegotiation with Functional Assessment Systems and no CAFAS information was available for the 99 youth (99/634 =15.61%) whose treatment episode started around this time or afterwards (D. Jackson, personal communication, July 24, 2017). Therefore, a Missing Values Analysis (MVA) was run in the Statistical Package for Social Sciences (SPSS) version 20 and it was determined that the data were Missing at Random (Little & Rubin, 1987). To address this missing data so that participants would not be excluded if they did not have a CAFAS total or substance use score, multiple imputation was used to calculate these values using relevant variables that occurred on the same level (i.e., level-two) of the analysis as the CAFAS total and substance use scores. Multiple imputation with five iterations was completed in SPSS to generate five simulated datasets in which the 101 CAFAS total and 110 CAFAS substance use scores were estimated and imputed. Single-level analyses of these five simulated datasets were then compared to determine whether any coefficients, F values, or p values changed significantly across the original and five iterative datasets. In the case of both major study aims, none of these values changed substantially to suggest they might affect main analyses. Thus, each analysis was run twice, both including and excluding the CAFAS total and substance use score variables, and results were compared. When the CAFAS scores were added into the models, no

relationships between other predictor variables and the criterion variables changed significantly for any analysis. Therefore, the analyses reported below includes the imputed CAFAS total and substance use scores. Missing MTPS data were not imputed as only approximately 1.6% of MTPS data were missing and MLM allows for participants to have unequal amounts of data for person-period variables (Heck et al., 2014).

Descriptive analyses. Prior to conducting the MLM analyses described next, descriptive analyses of the data were performed. First, means, standard deviations, and frequencies were calculated for youth demographic information, therapist information, and clinical service information. Next, exploratory analyses were conducted to examine the relationships between the variables described above (e.g., correlations between variables, t-tests between geographic isolation and family involvement and family intervention scores, chi-square analyses between geographic isolation and categorical predictors of interest).

Main analyses. A three-level MLM (Heck et al., 2014; Raudenbush & Bryk, 2002; Singer & Willet, 2003) approach was utilized to address the aims of the current study. This study followed guidelines outlined by Peugh (2010), which describe the following steps. After conducting descriptive analyses, the appropriate parameter estimation methods and covariance structures (e.g., full information [ML] or restricted estimation maximum likelihood [REML]) were selected. Parameter estimation is the extent to which the sample covariance matrix representing the model effectively approximated the observed sample data (Heck et al., 2014). In ML, both regression coefficients and variance components are included in the likelihood function, which can lead to an overly liberal hypothesis test if the sample size is small and there are more parameters. In REML, only the variance components are included in the likelihood

function and the regression coefficients are treated as unknown, which can lead to better estimates when there are a smaller number of groups in the study (Heck et al., 2014; Hox, 2002; Raudenbush & Bryk, 2002).

Second, the ICC from the null model (i.e., model without predictors) was calculated to identify the proportion of variance explained by the grouping structures of the population (i.e., time, youth, and therapist; Heck et al., 2014). The ICC can be interpreted as the within-subjects correlation of any two randomly chosen individuals in the same group (Hox, 2010; Quene & van den Bergh, 2004). Generally, differences on the main level of interest (i.e., the client-level in the present study) need to account for more than 5% of the ICC, or the between-group variance in youth improvement rate to justify a multilevel analysis (rather than a single-level analysis; Heck et al., 2014).

Third, the shapes of the within-subjects growth trends were inspected among a random subset of the population (n = 60, approximately 10%) to examine the overall shape of the trend (e.g., linear, log, natural log, negative exponent, natural log). Relevant terms of time were considered for inclusion if the growth rates were not linear (Raudenbush & Bryk, 2002; Singer & Willet, 2003). Finally, variables, including time in months, were centered, as needed, to maximize data interpretation (Heck et al., 2014). Consistent with previous studies using CAMHD data (e.g., Izmirian, 2016; Wilkie, 2016), the intercept was initially defined as the end status of treatment (i.e., the level of the dependent variable at the end of the study, adjusted for covariates in the model), with the last month of treatment coded as 0 and the first month of treatment -1. Recoding time in this manner allows the intercept to be interpreted as the final average progress rating or final average improvement on MTPS substance use treatment target

(ranging from 3 to 6 months), depending on the total length of the treatment episode for each client). However, due to multicollinearity between the linear and quadratic terms, a polynomial transformation was appropriate. Transforming the polynomials places the interpretation on the overall growth trend rather than change within any particular interval (Hox, 2010). Thus, in this study, the intercept is the grand mean, rather than the end status of treatment. It is possible to calculate end status by adding the coefficients for time to the intercept (Heck et al., 2014).

The current study examined whether (1) geographic isolation predicted the average substance use progress rating and rate of change, or slope of youth progress on the substance use treatment target (i.e., the dependent variable) during the first six months of treatment for adolescents with substance use concerns, (2) the use of family interventions and family involvement in treatment predicted the average substance use progress rating and rate of change (i.e., slope) of youth progress on the substance use treatment target during the first six months of treatment for adolescents with substance use concerns, and (3) family interventions mediated the effect of geographic isolation on youth substance use progress ratings, after controlling for youth covariates. Slope was examined by looking at the changes in substance use progress ratings across months. Given the nested nature of the data, MLM was used for all analyses (Raudenbush & Byrk, 2002; Singer & Willet, 2003).

Statistical Package for Social Sciences (SPSS) version 20 was utilized to analyze a three-level mixed effects model,[4] where time (in months) that the MTPS was completed was nested within youth, which were nested within therapists. Level-one includes time (in months). Level-

[4] Geographic isolation was included at the level-two, client level, due to the small number of groupings (i.e., geographically isolated and non-isolated).

two includes the main variables of interest (i.e., geographic isolation, family interventions and involvement), and controlled for between-client variation and youth-related variables (e.g., age, ethnicity, gender, initial impairment as measured by baseline total CAFAS score, comorbidity). Level-three included therapist covariates (e.g., highest degree, licensure status).

Below is the equation that represents multilevel modeling for the current study (Raudenbush & Bryk, 2002):

$$\text{Level-one: } Y_{tij} = \pi_{0ij} + \pi_{1ij} a_{tij} + e_{tij}$$

$$\text{Level-two: } \pi_{0ij} = \beta_{00j} + \beta_{01j} X_{0ij} + r_{0ij}$$

$$\pi_{1ij} = \beta_{10j} + \beta_{11j} X_{1ij} + r_{1ij}$$

$$\text{Level-three: } \beta_{00j} = \gamma_{000} + \gamma_{001} W_{1j} + u_{00j}$$

$$\beta_{01j} = \gamma_{010} + \gamma_{011} W_{1j} + u_{01j}$$

$$\beta_{10j} = \gamma_{100} + \gamma_{101} W_{1j} + u_{10j}$$

$$\beta_{11j} = \gamma_{110} + \gamma_{111} W_{1j} + u_{11j}$$

In these equations, the subscripts of *t, i* and *j* represent time, youth and therapist, respectively.[5] The model with the variables included is as follows (where *p* represents the number of parameters):

$$\text{Level-one: } Y_{tij} = \pi_{0ij} + \pi_{1ij} \mathbf{TIME}_{tij} + e_{tij}$$

$$\text{Level-two: } \pi_{0ij} = \beta_{00j} + \beta_{01j} \mathbf{FamInvolve}_{1ij} + \beta_{02j} \mathbf{Isolation}_{2ij} + \ldots \beta_{0pj} \mathbf{YouthAge}_{pij} r_{0ij}$$

$$\pi_{1ij} = \beta_{10j} + \beta_{11j} \mathbf{FamInvolve}_{1ij} + \beta_{12j} \mathbf{Isolation}_{2ij} + \ldots \beta_{1pj} \mathbf{YouthAge}_{pij} + r_{1ij}$$

$$\text{Level-three: } \beta_{00j} = \gamma_{000} + \gamma_{001} \mathbf{Licensure}_{1j} + \ldots \gamma_{00p} \mathbf{HighestDegree} + u_{00j}$$

[5] For readability, only select predictor variables are indicated in the sample equations. Isolation refers to whether youth were considered geographically isolated or not. FamInvolve refers to parent/family involvement in treatment. YouthAge refers to youth age at baseline. Licensure refers to therapist licensure status. HighestDegree refers to therapist highest degree.

$$\beta_{01j} = \gamma_{010} + \gamma_{011}\mathbf{Licensure}_{1j} + \ldots \gamma_{01p}\,\mathbf{HighestDegree} + u_{01j}$$

$$\beta_{10j} = \gamma_{100} + \gamma_{101}\,\mathbf{Licensure}_{1j} + \ldots \gamma_{10p}\,\mathbf{HighestDegree} + u_{10j}$$

$$\beta_{11j} = \gamma_{110} + \gamma_{111}\,\mathbf{Licensure}_{1j} + \ldots \gamma_{11p}\,\mathbf{HighestDegree} + u_{11j}$$

Exploratory Supplemental Analyses. Several additional analyses were preformed to better understand the data. Only the most pertinent results are included. First, additional definitions of geographic isolation were examined. Then, family and individual practice elements derived from the evidence-base (PDE) were examined. Finally, each of the individual practice elements was examined in level-two of the MLM to assess whether or not it predicted the average progress rating on the substance use treatment target.

To calculate a family PDE score and an individual PDE score, each of the MTPS practice elements were classified as either a family PDE or individual coping skills PDE depending on whether or not that practice element had appeared in at least 30% of the Level One (Best Support) protocols defined through PracticeWise's coding procedures and was defined for use with child or with parent/family (9 total; 3 family, 6 individual).[6] The family PDE and individual PDE scores were represented with the following equation.

$$\frac{\Sigma \text{ Family PDE used across the episode}}{\text{Number of Months (MTPSs)}}$$

A list of practices elements that had Level One support for youth of any age with substance use problems is located in Table 4. A list of practice elements that had Level Two support for youth of any age with substance use problems is located in Table 5.

[6] PDE scores were also examined for practice elements that had appeared in at least 10% of the Level One (Best Support) protocols, in at least 30% of the Level Two (Good Support or Better) protocols, and in at least 10% of the Level Two protocols defined through PracticeWise's coding procedures. Total Level-One and Level-Two family PDE and individual PDE score were also examined.

Table 4.

Percent of evidence-based treatment study groups that included the listed practice elements and had Level-One support for youth of any age with substance use problems (regardless of setting)

Format	Practice Element	Percent
C	**Psychoeducation - Child**	**54**
C	**Motivational Enhancement**	**47**
F	**Communication Skills**	**43**
C	**Problem Solving**	**43**
F	**Family Engagement**	**35**
F	**Family Therapy**	**35**
C	**Maintenance/Relapse Prevention**	**35**
C	**Assertiveness Training**	**31**
C	**Cognitive**	**31**
C	**Relationship/Rapport Building**	**31**
P	**Stimulus Control or Antecedent Management**	**31**
F	Modeling	24
F	Accessibility Promotion	20
F	Behavioral Contracting	20
F	Case Management	20
F	Goal Setting	20
P	Monitoring	20
C	Self-Monitoring	20
P	Psychoeducation - Caregiver	16
C	Relaxation	16
C	Therapist Praise/Rewards	16
F	Functional Analysis	12
F	Performance Feedback	12
C	Social Skills Training	12
C	Talent or Skill Building	12
P	Tangible Rewards	12
C	Activity Selection	8
C	Anger Management	8
C	Insight Building	8
C	Self-Reward/Self-Praise	8
C	Support Networking	8
C	Supportive Listening	8
P	Caregiver Coping	4
F	Cultural Training	4
C	Mindfulness	4
C	Personal Safety Skills	4
F	Praise	4

Note. This was calculated from a PracticeWise, LLC data pull dated March 2018. Bold items indicate practice elements that were included in 30% or more of the study groups that examined evidence based treatments. C = child, P = parent, F = family. Practice elements considered P or F were included in the PDE family score.

Table 5.

Percent of evidence-based treatment study groups that included the listed practice elements and had Level-Two or higher support for youth of any age with substance use problems (regardless of setting)

Format	Practice Element	Percent
C	**Problem Solving**	**49**
C	**Psychoeducation - Child**	**49**
C	**Maintenance/Relapse Prevention**	**44**
F	**Communication Skills**	**42**
C	**Motivational Enhancement**	**42**
P	**Stimulus Control or Antecedent Management**	**39**
F	**Family Therapy**	**36**
C	**Assertiveness Training**	**31**
F	**Family Engagement**	**31**
C	**Relationship/Rapport Building**	**31**
C	Cognitive	29
F	Goal Setting	26
F	Modeling	21
P	Psychoeducation - Caregiver	21
C	Self-Monitoring	21
F	Accessibility Promotion	18
F	Behavioral Contracting	18
F	Case Management	18
P	Monitoring	18
F	Functional Analysis	16
C	Talent or Skill Building	16
C	Therapist Praise/Rewards	16
F	Performance Feedback	13
C	Relaxation	13
C	Supportive Listening	13
P	Tangible Rewards	13
C	Activity Selection	11
C	Social Skills Training	11
F	Support Networking	11
C	Anger Management	8
C	Insight Building	8
C	Educational Support	6
C	Self-Reward/Self-Praise	6
P	Attending	3
P	Caregiver Coping	3
P	Commands	3
F	Cultural Training	3
F	Differential Reinforcement of Other Behavior	3
C	Mindfulness	3
C	Personal Safety Skills	3
F	Praise	3
F	Response Cost	3
C	Twelve-step Programming	3

Note. This was calculated from a PracticeWise, LLC data pull dated March 2018. Bold items indicate practice elements that were included in 30% or more of the study groups that examined evidence based treatments. C = child, P = parent, F = family. Practice elements considered P or F were included in the PDE family score.

RESULTS

Data Preparation and Missing Values

First, minimum and maximum values (i.e., response ranges) for each item, subscale, and total of all measures were calculated. No impossible values were found in the dataset. MTPSs were inspected to ensure they were valid (i.e., had treatment targets, had progress ratings for each treatment target, and had at least one PE). There were 30 MTPSs (0.01% of the total 3535 MTPSs) that did not have complete data (i.e., they were missing PEs).

Second, means, standard deviations, skewness, and kurtosis were examined for the CAFAS scores, family and individual intervention scores, and family and individual involvement scores, as well as the dependent variable of substance use progress ratings. Skewness and kurtosis values beyond positive or negative two were considered mild departures from normality (Y. Xu, personal communication, November 3, 2017). Table 6 provides the means, standard deviations, skewness and kurtosis values from these variables with bolded items representing potential variables with a non-normal distribution. Due to the high negative skew and kurtosis for the individual involvement variable (i.e., the frequency youth were involved in treatment during the episode), this was converted to a dummy coded variable reflecting youth who were involved in treatment each month during the episode, and those who were not involved in treatment each month during the episode (Y. Xu, personal communication, February 20, 2018). Given the other main variables of interest (e.g., family and individual intervention scores, family involvement score, total CAFAS) had normal distributions, it was determined that no further action was needed to address normality concerns.

Table 6.

Means, Standard Deviations, Skewness, and Kurtosis for Child and Adolescent Functional Assessment Scale (CAFAS), Family and Individual scores, and Progress Rating for Substance Use Target

Variable	Mean	Standard Deviation	Skewness	Kurtosis
CAFAS Substance Use	11.80	9.99	0.28	-1.08
CAFAS Total	103.15	31.40	0.01	0.65
Family Interventions Score	4.73	2.66	1.07	1.36
Individual Interventions Score	2.85	1.99	1.54	3.19
Family Involvement in Treatment	0.76	0.34	-1.28	0.17
Individual Involvement in Treatment	0.89	0.20	**-2.71**	**7.73**
Monthly Individual Involvement in Treatment[a]	0.69	0.46	-0.83	-1.32
Family PDE Score[b]	1.40	0.79	0.42	-0.20
Individual PDE Score[b]	2.59	1.28	0.72	0.48
Average Substance Use Progress Rating	2.71	1.54	0.69	-0.69

Note. Bolded values were considered non-normal. CAFAS = Child and Adolescent Functional Assessment Scale. PDE = Practices derived from the evidence-base.

[a]Dichotomized

[b]Level 1 Best Support within 30% or more of treatment protocols.

Descriptive Statistics

Table 7 includes the means for the core criterion variable for the full sample, and geographically isolated and non-isolated youth, across the six-month study window. Skewness and kurtosis scores as well as visual examinations of normality curves for the criterion variables across each of the six MTPS months suggested normality. As seen in Figure 2, the mean progress rating shows a slow, negatively accelerating curve for both geographically isolated and non-isolated youth, suggesting that modeling time in a non-linear fashion might increase Level 1 (within-subjects) model fit. As seen in Table 6, mean and standard deviations for the four study aim two predictor variables were: $M = 4.73$, $SD = 2.66$ for the Family Interventions score, $M = 2.85$, $SD = 1.99$ for the Individual Interventions score, $M = 0.76$, $SD = 0.34$ for family involvement in treatment, and $M = 0.69$, $SD = 0.46$ for the dichotomized monthly individual involvement in treatment. Single level correlations for the total sample are reported in Table 8.

A series of independent sample t-tests were done to evaluate the relationship between geographically isolated and non-isolated youth on several continuous demographic variables examined within the MLM analyses. The average episode length under investigation for geographically isolated youth ($M = 124.33$, $SD = 23.42$) was significantly shorter than for non-isolated ($M = 132.39$, $SD = 18.02$) youth, $t(632) = -4.71$, $p < .01$. The average length of the total IIH episode for geographically isolated youth ($M = 211.16$, $SD = 121.32$) was significantly shorter than for non-isolated ($M = 321.93$, $SD = 201.08$) youth, $t(632) = 8.02$, $p < .01$). No significant differences were found between isolated and non-isolated youth on age, CAFAS at treatment start, or CAFAS substance use rating.

A series of chi-square analyses were performed to evaluate the relationship between isolated and non-isolated youth on some of the categorical demographic variables included within the MLM analyses below. There were proportionately fewer male cases for geographic isolation (58.7%) than non-isolation (69.9%), (χ^2 (1, n = 634) = 8.44, $p < 0.01$). There were proportionately fewer geographically isolated youth (35.6%) than non-isolated youth (45.7%) with a primary diagnosis of disruptive behavior, (χ^2 (1, n = 625) = 6.41, $p < 0.05$), and proportionately fewer geographically isolated youth (52.78%) than non-isolated youth (65.21%) with any diagnosis of disruptive behavior, (χ^2 (1, n = 634) = 9.94, $p < 0.05$). The proportions of youth successfully discharged was higher among geographically isolated cases (50.0%) compared to non-isolated cases (34.3%), (χ^2 (1, n = 417) = 10.41, $p < 0.01$).

Table 7.

Mean progress ratings for each month of treatment by Geographic Isolation and Total Sample

	Geographically Isolated			Not isolated			Total Sample		
	n	*M* (*SD*)	Change	*n*	*M* (*SD*)	Change	*N*	*M* (*SD*)	Change
Month 1	114	2.45 (1.74)	--	178	2.17 (1.37)	--	292	2.28 (1.53)	--
Month 2	147	2.96 (1.95)	+0.51	204	2.49 (1.60)	+0.32	351	2.68 (1.77)	+0.04
Month 3	143	2.95 (2.02)	-0.01	216	2.80 (1.73)	+0.31	359	2.86 (1.85)	+0.18
Month 4	157	3.15 (1.89)	-0.2	230	2.70 (1.70)	-0.1	387	2.88 (1.79)	+0.02
Month 5	131	2.92 (1.93)	-0.23	196	2.90 (1.68)	+0.20	327	2.91 (1.78)	+0.03
Month 6	104	2.87 (2.02)	-0.05	175	2.72 (1.75)	-0.18	279	2.77 (1.86)	-0.14
Overall	269	2.90 (1.93)	--	365	2.64 (1.66)	--	634	2.71 (1.54)	--

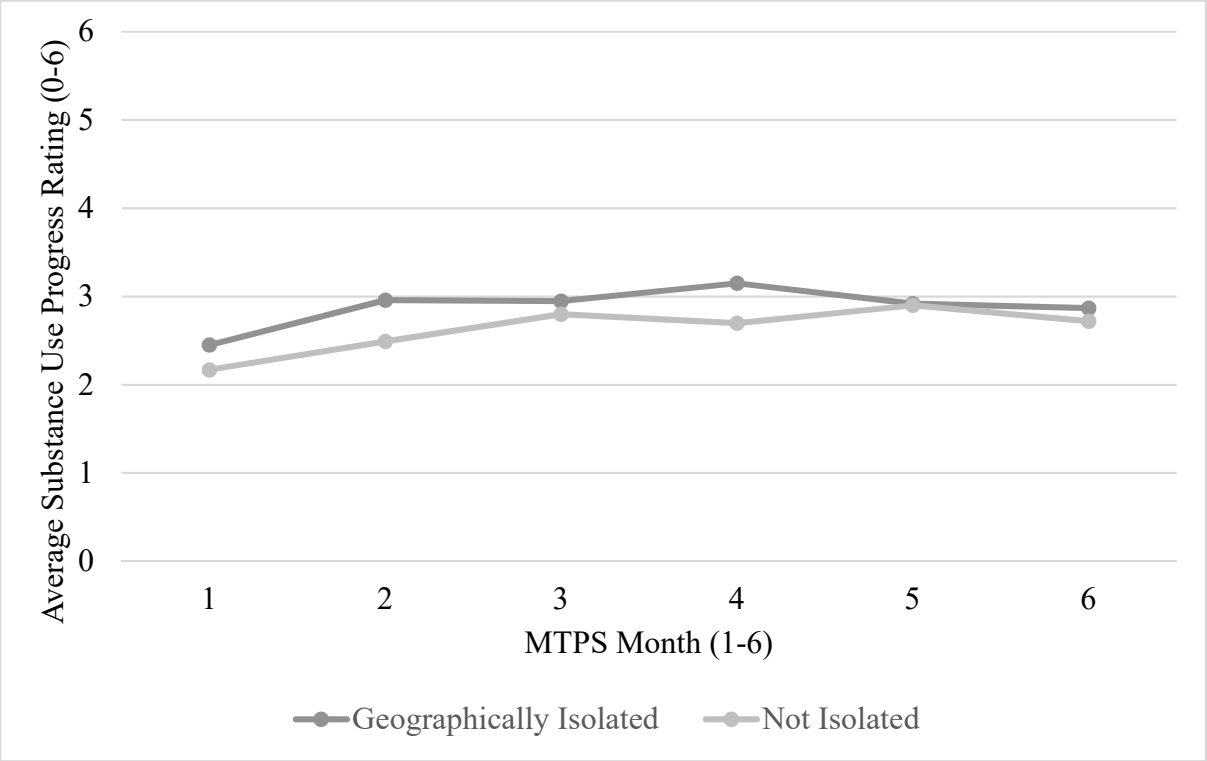


Figure 2. Average Substance Use Progress Rating During Each MTPS Month for Geographically Isolated and non-Isolated Youth

Table 8.

Correlations between variables for the total sample (N = 634)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19[a]	20[a]
1	--																			
2	.05	--																		
3	.08	-.01	--																	
4	**.13****	-.06	**.74****	--																
5	-.01	**.08***	**.23****	.00	--															
6	**.13****	-.03	**.18****	**.20****	.07	--														
7	.05	**.12****	.03	**.13****	**-.09***	**-.10***	--													
8	**.08***	-.02	**-.10****	.01	**-.11****	.03	-.04	--												
9	-.03	.03	.04	.05	-.01	-.02	-.08	**.10****	--											
10	-.01	-.07	.06	.05	.06	-.02	**.08***	.00	-.04	--										
11	-.06	.02	.01	-.04	.03	-.05	.01	.03	.03	**.63****	--									
12	**.10***	-.02	**.91****	**.89****	**.11****	**.13****	**.12****	-.06	.05	.07	.00	--								
13	.05	-.07	**.38****	**.43****	**.10***	**.09***	.03	-.03	-.04	-.03	**-.14****	**.44****	--							
14	-.03	.00	-.01	.01	-.02	-.01	-.05	**.16****	**.53****	.06	**.12****	-.01	**-.13****	--						
15	.00	-.01	.03	.06	-.05	**-.11****	**.16****	-.01	**.21****	.00	.02	.07	-.01	-.07	--					
16	-.01	**-.12****	-.03	-.08	**.10***	.02	**-.23****	-.08	**.24****	-.04	.00	-.06	.01	.05	**-.21****	--				
17	.03	-.06	.01	.06	-.02	.05	**-.13****	.07	**.09***	**.14****	**.14****	.04	.03	**.15****	**-.11****	.04	--			
18	.00	**-.30****	.04	.00	.02	**.13****	**-.11****	**-.17****	-.07	.02	.03	.02	.05	-.07	-.01	.04	.06	--		
19[a]	**.15****	-.08	**.69****	**.74****	**.08***	**.18****	**.08***	.01	.03	.08*	.02	**.78****	**.29****	.04	.04	**-.10***	.09*	.05	--	
20[a]	.05	**.17****	**.77****	**.58****	**.34****	**.12****	.05	**-.12****	.03	.04	-.01	**.71****	**.34****	-.02	.02	-.03	.03	-.02	**.51****	--

Note. Variables are defined as follows: (1) Average Substance Use Progress Rating, (2) Geographic Isolation (0 = not isolated, 1 = geographically isolated), (3) Family Intervention Score, (4) Individual Intervention Score, (5) Family Involvement in Episode, (6) Individual Involvement in Treatment Monthly (Y/N; 0 = involved less than monthly, 1 = involved each month), (7) Gender (0 = male, 1 = female), (8) Age, in years, (9) Sum of Diagnoses, (10) CAFAS: Total Score, (11) CAFAS: Substance Use, (12) Average Practices Used During Episode, (13) Average Targets Applied During Episode, (14) Any Diagnosis of SUD, (15) Any Diagnosis of Mood, (16) Any Diagnosis of DBD, (17) Substance Use TT once or more, (18) Treatment Episode Length, (19) PDE-Individual score, (20) PDE-Family score. CAFAS = Child and Adolescent Functional Assessment Scale. PDE = Practices derived from the evidence-base. SUD = Substance use disorder. DBD = Disruptive behavior disorder. TT = treatment target.

[a]Level 1 Best Support within 30% or more of treatment protocols.

**$p < 0.01$. * $p < 0.05$.

Preparing the Data for Multilevel Modeling

Before running the multilevel model, the appropriate parameter estimation for the model was selected. A preliminary next step was to partition the variance in the outcome into the proportion that is present at each level. For longitudinal models, such as the one in this study, it is typically recommended to use the unconditional growth model that includes time (i.e., the change in repeated measures) in the null model (Hox, 2010, pp. 88-89; Heck et al., 2014). This is due to the non-longitudinal MLMs assuming that each data point is unrelated, which is not the case for longitudinal models, where each time point is related to one another and is thus important to consider within the initial model (Heck et al., 2014).

After entering time in the model and calculating the variance components, the total variance estimate of the model was 3.17 (level-one variance of 2.59 + level-two variance of 0.04 + level-three variance of 0.54). Level-one, level-two, and level-three accounted for 81.69% (2.59/3.17), 1.29% (0.04/3.17), and 17.03% (0.54/3.17) of variance within the initial model, respectively. That is, it was estimated that level-one (i.e., time) would account for 81.69% of the variance, level-two (i.e., client-level variables, including whether cases were geographically isolated or not) would account for 1.29% of the variance, and level-three (i.e., therapist-level variables) would account for 17.03% of the variance in substance use progress ratings. While only 1.29% of the variance was estimated at the client-level, given the high number of therapists with only one client and that the primary focus of the study was on geographically isolated youth and their outcomes, which is located on the client level, the planned three-level MLM analyses were conducted.

The within-subjects growth trends were inspected for a sample of 60 subjects to determine the overall shape of the trend. Multiple growth shapes were observed (e.g., linear, quadratic, cubic, etc.). Given that a consistent pattern for the overall shape of the growth trend was not observed for the subsample of subjects, a null model was run with linear, quadratic, and cubic time polynomials as fixed effects. Both linear and quadratic time were found to be significant fixed effects, thus both forms were retained in subsequent analyses.

All continuous variables in the model (e.g., family involvement, family interventions in treatment, individual interventions in treatment, CAFAS), were grand mean centered (i.e., centered on the sample average).

Intercept-only model. The intercept-only model (also referred to as the "unconditional means model" that did not include time) indicated that the average progress rating across the episode was significantly different than zero ($p < .001$). The intercept of 2.67 was the grand-mean of substance use progress ratings across all months and all clients. A preliminary examination was done on several level-one error structures by comparing Akaike Information Criterion (AIC) estimates, with smaller AIC values indicating the proposed covariance structure was a better fit to the data. It was determined that an AR1 covariance structure fit the data best. The AR1 covariance structure assumes that the Level 1 variance remains constant across repeated measure occasions (Heck et al., 2014).

Level-one (time-only) model. The next model considered only the addition of time within clients, added as a fixed effect. Random effects for linear time were examined at level-two and level-three but were not retained due to not being significant or leading to a significant improvement in model fit. As is shown in Table 9, the grand-mean intercept of this model was

2.67 ($p < .001$). The average linear growth rate increased significantly over time ($\beta = 0.06$, $p < .001$). The quadratic growth rate was also significant ($\beta = -0.04$ ($p < .001$), indicating average substance use progress ratings slowed slightly over time. The covariance parameters of this model indicate there was significant variability in the intercept within youth (Wald Z = 12.28, $p < .001$) and between therapists (Wald Z = 4.42, $p < .001$), but not between youth (Wald Z = 1.52, $p = .129$).

Table 9.

Parameter Estimates and Standard Errors from Multilevel Models Predicting Average Substance Use Progress Rating Using Geographic Isolation (N = 634)

	Level-One Model	Level-Two Model	Level-Three Model	Final Model
Fixed effects				
Intercept[a]	2.67** (.08)	2.59**(.09)	2.64** (.12)	2.66**(.11)
Level 1				
Linear Time	.06** (.01)	.06** (.00)	.06** (.01)	.06** (.01)
Quadratic Time	-.04** (.01)	-.04** (.01)	-.04** (.01)	-.04** (.01)
Level 2				
Geographic Isolation	--	-.005 (.16)	-.01 (.97)	.02 (.16)
Age (years)[b]	--	.08~ (.04)	--	--
Gender	--	.21~ (.13)	--	--
Ethnicity	--	-.13 (.11)	--	--
Number of Diagnoses[b]	--	-.08 (.06)	--	--
CAFAS Total[b]	--	-.002 (.002)	--	--
Level 3				
Degree	--	--	-.11 (.30)	--
Credential Code	--	--	.12 (.18)	--
Licensure status	--	--	.37 (.49)	--
Variance Components				
Level-1 Within-client	2.31** (.19)	2.33** (.19)	2.31** (.19)	2.31** (.19)
Level -2 Between-client	.28 (.18)	.26 (.19)	.28 (.18)	.28 (.18)
Level-3 Between-therapist	.55** (.12)	.54** (.13)	.56** (.13)	.56* (.13)
Goodness of fit				
-2LL	7283.15	7297.68	7286.61	7284.95
No. of estimated parameters	7	12	10	8
AIC	7291.15	7305.70	7294.61	7292.95
BIC	7313.54	7328.06	7316.99	7315.34

Note. Standard errors are in parentheses. AIC = Aikaike information criterion. BIC = Bayesian information criterion.

*p <0.05, **p <0.001, ~p <.10

[a]Average substance use progress rating across the episode

[b]Grand-mean centered

Analysis for Aim 1: Examine how Geographic Isolation Relates to Therapeutic Progress During the First Six Months of Treatment

Level-two model. The next step of the model was to include between-youth fixed effect predictors to explain variance in the intercept (i.e., average progress rating on the substance use treatment target). In addition to the time variables from the level-one model, the following variables were added to the model as fixed effects in accounting for the level-two intercept: geographic isolation (major predictor of interest), gender, age in years (centered on the grand mean), and total CAFAS score at the start of the treatment episode (centered on the grand mean), ethnicity, and number of diagnoses (centered on the grand mean). To examine whether there were differences in rate of improvement between geographically isolated and non-isolated youth, interaction terms for geographic isolation and linear and quadratic time were included as fixed effects. No covariates were entered as random effects due to the lack of theoretical support to consider these variables as randomly varying and because prior research of this nature has not determined random effects to be significant.

Geographic isolation was not a significant predictor of the grand mean centered intercept (β = -.005, p = .98). Given that geographic isolation was the primary predictor of interest in this study, it was often retained in subsequent analyses to guard against falsely ruling out any potential influence. Interaction terms between geographic isolation and linear (β = -0.004, p =.848) and quadratic (β = -0.02, p = .257) time were also not significant, indicating no difference in the rate of change between isolated and non-isolated youth, and thus were removed from the final level-two model.

The following variables were not significant predictors and were removed from the final level-two model: age (β = .08, p = .052), gender (β = .21, p = .092), ethnicity (-0.13, p = .25),[7] number of diagnoses (β = -0.08, p = .17), and total CAFAS score at the start of the treatment episode (β = -0.002, p =.382). None of the variables examined were significant predictors of the slope of improvement for average substance use progress ratings.

The final level-two model included the significant variables orthogonal linear time (β = .06, p < .001) and orthogonal quadratic time (β = -0.04, p < .001) and the non-significant major predictor of interest geographic isolation (β = .01, p = .91). The grand mean intercept was 2.66 (p < .001), which reflects the average substance use progress rating for youth across the episode. The end status substance use progress rating for youth was approximately 2.68 (i.e., 2.66 + .063 + -.042 = 2.682).

Level-three model. The third step of model development was to add between-therapist fixed effect predictors to explain variance in the intercept. In addition to carrying over the time variables from the time-only model, and geographic isolation from the level-two model, therapist degree (coded as doctorate compared to non-doctorate), credential code (coded as qualified mental health professional compared to mental health professional/paraprofessional) and licensure status (coded as licensed and unlicensed) were added to the model as fixed-effects for the level-three model. Given the large amount of the variance at the clinician level, these variables were also examined as interactions with linear time. Therapist degree (β = -.11, p = .73), credential code (β = .12, p = .50), and licensure status (β = .37, p = .45), and interactions of

[7] A number of variables for race and ethnicity (e.g., all races as a categorical variable, a dichotomous Y/N Native Hawaiian variable, a dichotomous Y/N multiethnic variable) were considered and all were nonsignificant. When Multiethnic Y/N was considered it reduced the sample to 595. Thus, values from other covariates from Level-Two are from a model that included the full sample without ethnicity or race included as a covariate.

these variables with linear time (p = .12 to .71) were all not significant predictors of the intercept, whether entered separately or in a combined model, and were not included in the final model. This resulted in the final model for this study including predictors only at level-one and level-two. However, the variance components were still estimated for the therapist level, since it was appropriate to consider the covariates at level-one and level-two as nested within therapists, even without significant covariates included at that level.

Study aim 1 summary. The hypothesis that geographically isolated youth would experience a slower rate and lower levels of substance use progress ratings in comparison to non-isolated youth was not supported. The final study aim 1 model included the significant variables orthogonal linear time and orthogonal quadratic time, and the non-significant major predictor of interest geographic isolation.

Analysis for Aim 2: Determine Whether Use of Family Interventions and Family Involvement in Treatment Predicts Youth Outcomes.

Independent sample t-tests were conducted to examine whether there were differences in the use of family interventions and family involvement in treatment between geographically isolated and non-isolated youth. As is shown in Table 10, geographically isolated youth (M = .80, SD = .32) had families that were somewhat more likely to be involved in treatment on average during the first six months of the chosen episode than youth from the non-isolated (M = .74, SD = .36) families, $t(632) = 2.09$, $p < .05$). However, there was no difference in the dichotomized monthly individual involvement in treatment for geographically isolated (M =.67, SD = .47) and non-isolated (M = .70, SD = .46) youth, $t(632) = -.84$, $p = .40$. There was also no difference in the use of family interventions between geographically isolated (M = 4.71, SD =

2.49) and non-isolated (M = 4.74, SD = 2.78) youth, $t(632) = -.18$, $p = .86$, or in the use of individual interventions between geographically isolated (M = 2.67, SD = 1.73) and non-isolated (M = 2.90, SD = 2.17) youth, $t(627) = -1.50$, $p = .13$.

MLM building for the level-one time-only models occurred as described for study aim 1. Geographic isolation was retained as a predictor for study aim 2 analyses even though it was not found to be a significant predictor in study aim 1 given that it was one of the major predictors of interest in the present study.

Table 10.

Means, Standard Deviations, T-tests for Use of Family Interventions and Involvement

	Geographically Isolated (n = 269)		Not Isolated (n = 365)		
	M	*SD*	*M*	*SD*	*t*
Family Interventions Score	4.71	2.49	4.74	2.78	-0.18
Individual Interventions Score	2.67	1.73	2.90	2.17	-1.50
Family Involvement	0.80	.32	.74	.36	2.09*
Individual Involvement Monthly[a]	0.67	.47	.70	.46	-.84
Family PDE[b]	1.55	.76	1.29	.80	4.25**
Individual PDE[b]	2.48	1.27	2.68	1.29	-1.94~

Note. Interventions = Practice elements applied. Involvement = Participation in treatment. PDE = Practices derived from the evidence-base.
*$p < .05$, ** $p < .01$, ~$p < .10$
[a]Dichotomized
[b]Level 1 Best Support within 30% or more of treatment protocols.

Level-two model. The second step of the model was to include between-youth fixed effect predictors to explain variance in the intercept (i.e., grand mean progress rating on the substance use treatment target). In addition to the variables examined in the study aim 1 model, the following variables were added to the model as fixed effects in accounting for the level-two

intercept: family involvement in treatment (centered on the grand mean), and family interventions used in treatment (centered on the grand mean), as well as individual's involvement in treatment (involved in treatment monthly or involved less than monthly), and individual interventions used in treatment (centered on the grand mean).

As is shown in Table 11, both individual interventions used in treatment (β = .13, p < .001), and individual monthly involvement in treatment (β = .41, p < .01) were significant predictors of the intercept. However, neither family interventions used in treatment (β = -.02, p = .56) nor family involvement in treatment (β = -.06, p = .76) were significant predictors of the intercept. Geographic isolation (β = .06, p = .73), a major predictor of interest in this study, was also not significant.

The following variables were not significant predictors and were removed from the final study aim 2 level-two model: age (β = .06, p =.12), gender (β = .17, p = .16), ethnicity (β = -.11, p =.30), number of diagnoses (β = -.08, p = .19), total CAFAS score at the start of the treatment episode (β = -.001, p = .39), family interventions used in treatment (β = -.02, p = .56), and family involvement in treatment (β = -.06, p = .76). None of the variables examined were significant predictors of the slope of improvement for average substance use progress ratings.

The final level-two model included the following significant variables: orthogonal linear time (β = .06, p < .001), orthogonal quadratic time (β = -.04, p < .001), individual interventions score (β = .13, p < .001), and individual monthly involvement in treatment (β = .41, p < .01). These changed the intercept to 2.39 (p < .001), indicating that the overall mean score on the substance use progress rating during the study period was 2.39 for youth who were involved in treatment each month and who received the average amount of individual interventions applied

across the treatment episode. End status substance use progress rating was approximately 2.41 (i.e., 2.39 + .06 + -.04 = 2.41).

In terms of the specific predictors of the grand mean centered intercept, monthly individual involvement in treatment and individual interventions used in treatment significantly predicted higher average substance use progress rating. More specifically, youth that were involved in treatment each month during the episode had an average substance use progress rating that increased by .41 points on the MTPS ($p < .01$). In addition, for each additional individual intervention reported, average substance use progress rating increased by .13 ($p < .001$).

Table 11.

Parameter Estimates and Standard Errors from Multilevel Models Predicting Average Substance Use Progress Rating Using Family Interventions and Family Involvement in Treatment (N= 634)

	Level-Two Model	Level-Three Model	Final Model
Fixed effects			
Intercept[a]	2.28** (.15)	2.36** (.13)	2.39** (.11)
Level 1			
Linear Time	.06** (.01)	.06** (.01)	.06** (.01)
Quadratic Time	-.04** (.01)	-.04** (.01)	-.04** (.01)
Level 2			
Geographic Isolation	.06 (.16)	--	--
Age (years)[b]	.06 (.04)	--	--
Gender	.17 (.13)	--	--
Ethnicity	-.11 (.11)	--	--
Number of Diagnoses[b]	-.08 (.06)	--	--
CAFAS Total[b]	-.00 (.00)	--	--
Family Interventions score[b]	-.02 (.04)	--	--
Individual Interventions score[b]	.15* (.05)	.13** (.03)	.13** (.03)
Family Involvement[b]	-.06 (.76)	--	--
Individual Involvement Monthly[c]	.42* (.12)	.42** (.01)	.41* (.12)
Level 3			
Degree	--	-.18 (.30)	--
Credential Code	--	.12 (.17)	--
Licensure status	--	.12 (.51)	--
Variance Components			
Level-1 Within-client	2.34** (.19)	2.33** (.19)	2.33** (.19)
Level -2 Between-client	.13 (.18)	.15 (.18)	.15 (.18)
Level-3 Between-therapist	.59** (.13)	.60** (.13)	.59** (.13)
Goodness of fit			
-2LL	7279.85	7260.12	7258.65
No. of estimated parameters	16	11	9
AIC	7287.85	7268.12	7266.65
BIC	7310.22	7290.50	7289.04

Note. Standard errors are in parentheses. AIC = Akaike information criterion. BIC = Bayesian information criterion.
*p <0.01 **p <0.001, ~p <.10
[a]Average substance use progress rating across the episode
[b]Grand-mean centered
[c]Dichotomized

Level-three model. The third step of the model development included adding between-therapist fixed-effect predictors to explain variance in the intercept (i.e., the average substance use progress rating). In addition to the time variables from the level-one model and the

significant level-two predictors, the following variables were added as fixed-effects at the level-three model: therapist degree (coded as doctorate compared to non-doctorate), credential code (coded as qualified mental health professional compared to mental health professional/paraprofessional) and licensure status (coded as licensed and unlicensed). None of these level-three variables predicted the intercept (p = .49 to .81) and were not included in the final model. This resulted in the final model for this study aim only including predictors at level-one and level-two.

Study aim 2 summary. Essentially, there was little support for the hypothesis that family interventions or family involvement in treatment predicted improvement for youth and that individual interventions and individual involvement in treatment would be minimal or nonsignificant predictors of the substance use progress rating. The final study aim 2 model included the significant predictors orthogonal linear time, orthogonal quadratic time, the individual interventions in treatment score, and the monthly individual involvement in treatment score.

Analysis for Aim 3: Examine Whether the Use of Family Interventions and Family Involvement in Treatment Mediate any Relationship Between Geographic Isolation and Youth Treatment Outcomes.

Given geographic isolation was not a significant predictor of average substance use progress rating (p = .91) it was not appropriate to examine the mediation model (Baron & Kenny 1986).

Exploratory Supplemental Analyses

Exploratory supplemental analyses: Considering other definitions of isolation.

Youth in this study were identified as geographically isolated and non-isolated depending on whether their services were coordinated by an O‘ahu or non-O‘ahu FGC. However, given that both the Windward and Leeward FGCs both serve areas considered by some definitions as rural (OBM, 2016; U.S. Census Bureau, 2015), alternative definitions of isolation were considered that included Leeward and Windward FGCs as geographically isolated, both independently, and together. In addition, another definition of isolation was considered using the CAMHD IIH rural code.

Since only the geographic isolation variable was replaced by variables representing different definitions of isolation, the level-one model was the same as in prior analyses and model development started at level-two. The same covariates were included as within the prior analysis, with the exception of the variable representing geographic isolation. First, a variable considering Leeward as isolated was entered into the model (0 = O‘ahu FGCs, with the exception of Leeward; 1 = all non-O‘ahu FGCs and Leeward). Another variable considering Windward as isolated was entered into a separate model (0 = O‘ahu FGCs, with the exception of Windward, 1 = all non-O‘ahu FGCs and Windward). A variable that considered both Windward and Leeward as isolated was examined within another model (0 = O‘ahu FGCs, with the exception of Leeward and Windward, 1 = all non-O‘ahu FGCs, Windward, and Leeward). Finally, the CAMHD IIH rural code was also examined (0 = youth who received IIH services, 1 = youth who received IIH rural services).

Table 12.

Parameter Estimates and Standard Errors from Multilevel Models Predicting Average Substance Use Progress Rating Considering Leeward Family Guidance Center as Geographically Isolated (N = 634)

	Level-Two Model	Final Model
Fixed effects		
Intercept[a]	2.43** (.13)	2.47** (.12)
Level 1		
Linear Time	.06** (.01)	.06** (.01)
Quadratic Time	-.04* (.02)	-.04** (.01)
Level 2		
Geographic Isolation	.25~ (.14)	.30* (.14)
Age (years)[b]	.08~ (.04)	--
Gender	.20 (.13)	--
Ethnicity	-.13 (.23)	--
Number of Diagnoses[b]	-.06 (.06)	--
CAFAS Total[b]	-.001 (.002)	--
Variance Components		
Level-1 Within-client	2.33** (.19)	2.32** (.19)
Level -2 Between-client	.25 (.18)	.27 (.15)
Level-3 Between-therapist	.52 (.12)	.54** (.12)
Goodness of fit		
-2LL	7294.90	7280.72
No. of estimated parameters	12	8
AIC	7329.28	7288.72
BIC	7325.28	7311.10

Note. Standard errors are in parentheses. AIC = Akaike information criterion. BIC = Bayesian information criterion.
*p <0.05 **p <0.001, ~p <.10
[a]Average substance use progress rating across the episode
[b]Grand-mean centered

Leeward. When the variable examining Leeward as isolated was entered in the model, variables that were not significant predictors of the intercept included: gender, total CAFAS score at the start of the treatment episode, number of diagnoses, ethnicity, and age. The inclusive geographic isolation variable was a significant predictor of average substance use progress rating during the episode, along with orthogonal linear time and orthogonal quadratic time. As is shown in Table 12, these variables together changed the grand mean intercept to be 2.47 (p < .001), which means that the average substance use progress rating for youth who were

considered not isolated was 2.47. In this model, and contrary to predictions, youth who were considered isolated had 0.30 higher average substance use rating as compared with non-isolated clients ($p < .05$). The time slope model was examined, however no variables were significant at predicting the rate of increase in substance use progress rating. Therapist variables were entered in this model but were not significant predictors of substance use progress ratings ($p = .41$ to .99).

Windward. When considering a definition of geographic isolation that considered Windward as isolated, this new variable was not significant when considered independently or together with other covariates in predicting average substance use progress ratings.

Leeward and Windward combined. An additional model was examined that looked at a definition of Leeward and Windward both as isolated. This variable was not a significant predictor of substance use progress ratings when considered independently or together with other covariates.

Rural IIH code. A model was examined that used the IIH rural code. This model considered all youth ($n = 20$) receiving services with the code 13111 as rural/geographically isolated and the remaining youth ($n = 614$) receiving services coded 13101 as not rural/not isolated. This variable was not a significant predictor of substance use progress ratings when considered independently or together with other covariates.

Exploratory supplemental analyses: Family interventions and involvement alone. Additional supplemental analyses were conducted examining the influence of family interventions and family involvement without the presence of individual interventions or involvement. The level-one model was the same as in prior analyses and model development

started at level-two. The same covariates (i.e., geographic isolation, ethnicity, number of diagnoses, age, gender, total CAFAS) were included as within prior MLM analyses. Individual interventions and involvement were not included in these analyses.

Variables that were not significant predictors of the grand mean intercept and were removed from the final level-two model included: geographic isolation, gender, ethnicity, number of diagnoses, total CAFAS score, and family involvement. The final level-two model for the intercept included the significant variables age (grand mean centered) and family interventions (grand mean centered). As is shown in Table 13, the intercept was 2.66 ($p < .001$), which meant that the average substance use progress rating across the episode was 2.66 for youth who were the average age in the sample (i.e., 16.00 years) and had received the average number of family interventions per month. The end status intercept was approximately 2.68 (i.e., 2.66 + .06 + -.04 = 2.68).

In terms of individual predictors of the intercept, age and the average number of family interventions used per month predicted higher average substance use progress ratings. For every year of age beyond the grand mean (i.e., 16.00 years), the average substance use progress rating increased by .09 ($p < .05$). For every additional family intervention used per month beyond the grand mean (i.e., 4.72), the average substance use progress rating increased by .06 points ($p < .05$).

When examining the slope model, no predictors were significant at predicting the rate of change in average substance use progress rating. When therapist characteristics (i.e., licensure status, highest degree, credentialing status) were considered at level-three, no variables were

significant predictors of average substance use progress rating and were removed from the model.

It should be noted that family involvement was considered in the model independently of family interventions, individual interventions, and monthly individual involvement, and it also was not a significant predictor of average substance use progress ratings (β = -.14, p = .46).

Table 13.

Parameter Estimates and Standard Errors from Multilevel Models Predicting Average Substance Use Progress Ratings Using Family Interventions and Family Involvement Alone (N = 634)

	Level-Two Model	Final Model
Fixed effects		
Intercept[a]	2.60** (.12)	2.66** (.08)
Level 1		
Linear Time	.06** (.01)	.06** (.01)
Quadratic Time	-.04** (.01)	-.04** (.01)
Level 2		
Geographic Isolation	-.01 (.16)	--
Age (years)[b]	.09* (.04)	.09* (.04)
Gender	.20 (.11)	--
Ethnicity		--
Number of Diagnoses[b]	-.10 (.12)	--
CAFAS Total[b]	-.00 (.00)	--
Family Interventions score[b]	.07* (.03)	.06* (.02)
Family Involvement[b]	-.19 (.20)	--
Variance Components		
Level-1 Within-client	2.33** (.19)	2.31** (.19)
Level -2 Between-client	.24 (.20)	.27 (.18)
Level-3 Between-therapist	.55** (.12)	.53** (.12)
Goodness of fit		
-2LL	7296.59	7283.88
No. of estimated parameters	14	9
AIC	7304.59	7291.88
BIC	7326.96	7314.27

Note. Standard errors are in parentheses. AIC = Akaike information criterion. BIC = Bayesian information criterion.

*p <0.05 **p <0.001, ~p <.10

[a]Average substance use progress rating across the episode

[b]Grand-mean centered

Exploratory supplemental analyses: Practices derived from the evidence-base for adolescent substance use. Additional supplemental analyses were conducted examining the influence of family and individual PDE. Family PDE and individual PDE scores were developed for practice elements appearing in at least 30% of the Level One (Best Support) protocols defined through PracticeWise's coding procedures. The level-one model was the same as in prior analyses and model development started at level-two. In addition to the family PDE and individual PDE scores, the same covariates (i.e., geographic isolation, ethnicity, number of diagnoses, age, gender, total CAFAS) were included as within prior MLM analyses. Only the individual PDE score was a significant predictor of average substance use progress ratings (β = .21, $p < .001$). When considered independently of the individual PDE score, both alone, and with the aforementioned covariates, the family PDE score was not a significant predictor of average substance use progress rating ($p = .193$).[8]

When additional MLM analyses were examined that included family PDE and individual PDE scores for practice elements that appeared in at least 10% of the Level One (Best Support) protocols, both the family PDE ($\beta = .22$, $p < .001$) and the individual PDE ($\beta = -.11$, $p < .05$) scores were significant predictors of average substance use progress rating.[9] No covariates were significant in any of the PDE models.

Exploratory supplemental analyses: Practice elements examined independently. Tables 14 list the frequency of practice element endorsement for geographically isolated and non-isolated youth, and the total sample. Additional supplemental analyses were conducted by

[8] Consistent results were found when Family PDE and Individual PDE scores were examined for practice elements that had appeared in at least 30% of the Level Two (Good Support or Better) protocols.
[9] Consistent results were found when Family PDE and Individual PDE scores were examined for practice elements that had appeared in at least 10% of the Level Two (Good Support or Better) protocols.

entering each PE separately into level-two of the MLM to examine beta size and statistical significance of each PE predicting average substance use progress rating. Only the practice elements that 10% or more of the sample (i.e., 64 youth; 643 x .10 = 63.4) received were included. These models included linear time at level-one and no additional variables at level-two or -three. These analyses were conducted with the understanding that there would be a greatly inflated cumulative alpha, that several PEs were likely correlated with one another, and that several potentially important covariates were not included in these analyses. Thus, these analyses and results are interpreted with caution. Figure 3 shows practice elements based on the size of the beta coefficient, regardless of statistical significance.

Table 14.

Frequency counts of practice elements by geographic isolation and the total sample (N = 634)

	PE used at least once throughout the episode			Percent of months PE was used		
Practice Element (PE)	Isolated	Not Isolated	Total Sample	Isolated	Not Isolated	Total Sample
Supportive Listening	235 (87.4%)	321 (87.9%)	545 (86.0%)	56.4% (34.0)	62.2% (34.1)	59.4% (34.9)
Problem Solving	224 (83.3%)	310 (84.9%)	527 (83.1%)	55.6% (35.6)	53.3% (34.5)	51.8% (34.7)
Communication Skills	217 (80.7%)	274 (75.1%)	501 (79.0%)	49.7% (34.9)	49.7% (38.1)	49.6% (36.0)
Cognitive	202 (75.1%)	272 (74.5%)	476 (75.1%)	48.8% (36.9)	49.7% (37.9)	49.3% (37.6)
Natural and Logical Consequences	211 (78.4%)	319 (87.4%)	472 (74.4%)	47.2% (35.9)	47.1% (32.2)	47.1% (36.7)
Relationship or Rapport Building	205 (76.2%)	270 (74.0%)	540 (85.2%)	46.3% (36.9)	45.2% (35.2)	44.3% (31.9)
Emotional Processing	206 (76.6%)	266 (72.9%)	456 (71.9%)	44.7% (35.9)	44.6% (36.5)	43.6% (37.2)
Insight Building	200 (74.3%)	266 (72.9%)	459 (72.4%)	43.4% (34.8)	43.1% (35.9)	42.9% (35.6)
Therapist Praise or Rewards	201 (74.7%)	258 (70.7%)	445 (70.2%)	42.9% (34.6)	42.9% (36.2)	41.6% (36.3)
Family Therapy	188 (69.9%)	251 (68.8%)	465 (73.3%)	40.5% (35.3)	41.7% (37.4)	41.4% (35.2)
Psychoeducation Child	221 (82.2%)	241 (66.0%)	439 (69.2%)	40.5% (31.0)	41.5% (37.8)	41.0% (36.4)
Family Engagement	173 (64.3%)	246 (67.4%)	475 (74.9%)	38.1% (36.9)	39.5% (36.4)	40.6% (34.1)
Parent Coping	178 (66.2%)	259 (71.0%)	447 (70.5%)	37.1% (35.7)	39.0% (35.3)	39.7% (35.3)
Psychoeducation Parent	178 (66.2%)	269 (73.7%)	424 (66.9%)	37.0% (37.1)	37.6% (32.4)	38.5% (36.7)
Motivational Interviewing	175 (65.1%)	254 (69.6%)	404 (63.7%)	36.8% (37.2)	37.2% (34.1)	38.3% (37.4)
Skill Building	163 (60.6%)	211 (57.8%)	417 (65.8%)	34.0% (36.3)	34.0% (36.4)	35.3% (34.4)
Goal Setting	152 (56.5%)	239 (65.5%)	363 (57.3%)	33.2% (34.8)	33.9% (33.4)	33.7% (35.7)
Educational Support	150 (55.8%)	215 (58.9%)	363 (57.3%)	30.7% (34.6)	31.6% (34.7)	28.8% (33.0)
Modeling	149 (55.4%)	194 (53.2%)	343 (54.1%)	26.5% (31.4)	29.0% (34.3)	27.9% (33.1)
Activity Scheduling	132 (49.1%)	179 (49.0%)	332 (52.4%)	26.0% (33.4)	27.1% (34.4)	27.0% (33.4)
Social Skills Training	148 (55.0%)	181 (49.6%)	317 (50%)	25.0% (30.1)	25.0% (31.9)	25.3% (32.7)
Parent or Teacher Monitoring	129 (48.0%)	185 (50.7%)	285 (45.0%)	22.4% (29.9)	24.8% (32.2)	23.2% (32.5)
Parent or Teacher Praise	140 (52.0%)	187 (51.2%)	308 (48.6%)	20.8% (25.6)	24.8% (31.5)	23.1% (30.7)

Self Monitoring	121 (45.0%)	182 (49.9%)	293 (46.2%)	20.7% (29.3)	24.2% (32.1)	22.0% (30.2)
Maintenance or Relapse Prevention	114 (42.4%)	146 (40.0%)	294 (46.4%)	20.4% (29.6)	23.2% (33.6)	21.3% (29.4)
Mentoring	102 (37.9%)	165 (45.2%)	236 (37.2%)	19.6% (30.8)	20.5% (29.0)	20.5% (31.7)
Mindfulness	118 (43.9%)	143 (39.2%)	257 (40.5%)	19.4% (28.4)	18.7% (29.4)	19.4% (29.5)
Crisis Management	106 (39.4%)	153 (41.9%)	294 (46.4%)	18.0% (29.1)	18.5% (28.2)	19.2% (26.7)
Relaxation	112 (41.6%)	109 (29.9%)	271 (42.7%)	17.9% (27.2)	18.3% (33.4)	18.9% (28.3)
Care Coordination	90 (33.5%)	154 (42.2%)	211 (33.3%)	16.7% (28.5)	18.0% (27.4)	18.8% (32.4)
Behavioral Contracting	89 (33.1%)	127 (34.8%)	200 (31.5%)	14.6% (25.9)	17.3% (29.2)	16.0% (27.9)
Self-Rewards or Self-Praise	0 (0.0%)	111 (30.4%)	206 (32.5%)	14.3% (27.0)	17.0% (29.3)	15.4% (27.7)
Assertiveness Training	82 (31.2%)	108 (29.6%)	179 (28.2%)	14.3% (27.0)	14.7% (26.9)	13.3% (26.8)
Commands	79 (29.4%)	115 (31.5%)	172 (27.1%)	13.0% (25.4)	13.3% (24.7)	12.7% (25.2)
Tangible Rewards	82 (30.5%)	95 (26.0%)	198 (31.2%)	12.3% (23.1)	12.6% (26.7)	12.4% (23.1)
Individual Therapy for Caregiver	83 (30.9%)	76 (20.8%)	145 (22.9%)	11.0% (20.7)	9.3% (22.6)	9.2% (20.9)
Personal Safety Skills	64 (23.8%)	72 (19.7%)	129 (20.3%)	10.1% (22.4)	9.0% (21.6)	8.4% (20.8)
Stimulus Control or Antecedent Management	66 (24.5%)	77 (21.1%)	135 (21.3%)	10.1% (21.7)	8.9% (22.0)	8.4% (20.5)
Attending	54 (20.1%)	69 (18.9%)	126 (19.9%)	8.4% (21.1)	8.3% (21.0)	8.2% (20.8)
Interpretation	52 (19.2%)	55 (15.1%)	122 (19.2%)	7.7% (19.1)	8.1% (22.5)	8.0% (19.8)
Medication or Pharmocotherapy	59 (21.9%)	72 (19.7%)	116 (18.3%)	7.2% (17.2)	8.0% (20.6)	7.3% (18.9)
Line of Sight Supervision	50 (18.6%)	63 (17.3%)	104 (16.4%)	6.7% (16.9)	7.0% (18.9)	6.6% (18.4)
Ignoring/DRO	49 (18.2%)	52 (14.2%)	101 (15.9%)	6.4% (16.6)	6.4% (19.2)	6.4% (18.1)
Exposure	44 (16.4%)	54 (14.8%)	76 (12.0%)	5.5% (15.4)	5.7% (17.8)	5.5% (18.1)
Response Cost	38 (14.1%)	50 (13.7%)	78 (12.3%)	5.1% (15.2)	5.3% (16.2)	5.0% (16.5)
Response Prevention	35 (13.0%)	40 (11.0%)	84 (13.2%)	4.3% (13.8)	5.0% (17.4)	4.8% (15.3)
Guided Imagery	24 (8.9%)	40 (11.0%)	78 (12.3%)	2.9% (11.6)	4.2% (15.2)	4.6% (15.5)
Catharsis	42 (15.6%)	24 (6.6%)	47 (7.4%)	2.8% (6.6)	3.4% (15.1)	3.0% (13.3)
Milieu Therapy	23 (8.6%)	23 (6.3%)	41 (6.5%)	2.5% (10.2)	2.7% (12.4)	2.3% (11.1)
Cultural Training	15 (5.6%)	29 (7.9%)	37 (5.8%)	2.4% (12.0)	2.3% (9.5)	2.2% (10.6)

Functional Analysis	17 (6.3%)	23 (6.3%)	40 (6.3%)	2.2% (9.8)	2.2% (10.7)	2.2% (10.3)
Twelve Step	22 (8.2%)	26 (7.1%)	73 (11.5%)	2.2% (8.5)	2.2% (10.4)	2.1% (5.8)
Peer Pairing	21 (7.8%)	31 (8.5%)	34 (5.4%)	2.0% (8.2)	1.5% (5.0)	1.5% (7.5)
Marital Therapy	14 (5.2%)	13 (3.6%)	34 (5.4%)	1.6% (7.4)	1.1% (7.2)	1.4% (7.0)
Time Out	23 (8.6%)	23 (6.3%)	46 (7.3%)	1.5% (5.0)	1.1% (4.2)	1.3% (4.6)
Free Association	14 (5.2%)	12 (3.3%)	18 (2.8%)	1.1% (5.2)	0.8% (5.6)	1.0% (7.5)
Play Therapy	6 (2.2%)	13 (3.6%)	22 (3.5%)	0.9% (7.3)	0.6% (3.4)	0.8% (5.0)
Unclear*	5 (1.9%)	8 (2.2%)	23 (3.6%)	0.8% (7.8)	0.5% (4.9)	0.6% (3.3)
Eye Movement or Tapping	2 (0.7%)	5 (1.4%)	9 (1.4%)	0.6% (6.8)	0.4% (3.5)	0.5% (5.2)
Hypnosis	10 (3.7%)	6 (1.6%)	11 (1.7%)	0.6% (3.2)	0.3% (2.8)	0.4% (2.9)
Behavioral Management*	4 (1.5%)	7 (1.9%)	5 (0.8%)	0.4% (3.5)	0.3% (2.4)	0.3% (4.7)
Biofeedback or Neurofeedback	5 (1.9%)	3 (0.8%)	7 (1.1%)	0.4% (3.1)	0.2% (2.7)	0.3% (3.7)
Parenting*	1 (0.4%)	3 (0.8%)	6 (0.9%)	0.3% (4.6)	0.2% (2.1)	0.2% (2.8)
Assessment*	4 (1.5%)	4 (1.1%)	5 (0.8%)	0.3% (2.3)	0.2% (1.7)	0.2% (2.0)
Legal Assistance or Involvement*	2 (0.7%)	4 (1.1%)	5 (0.8%)	0.2% (2.5)	0.2% (1.7)	0.1% (1.6)
Other*	1 (0.4%)	2 (0.5%)	3 (0.5%)	0.1% (1.2)	0.1% (1.9)	0.1% (1.6)
Physical Exercise	1 (0.4%	1 (0.3%)	2 (0.3%)	0.1% (1.0)	0.1% (1.7)	0.1% (1.5)
Thought Field Therapy	1 (0.4%)	3 (0.8%)	5 (0.8%)	0.1% (1.0)	0.1% (1.6)	0.1% (1.5)
Discrete Trial Training	1 (0.4%)	3 (0.8%)	4 (0.6%)	0.1% (1.0)	0.1% (1.5)	0.1% (1.3)
Anger Management *	0 (0.0%)	3 (0.8%)	3 (0.5%)	0.0% (0.0)	0.1% (1.5)	0.1% (1.2)
Counseling*	0 (0.0%)	0 (0.0%)	3 (0.5%)	0.0% (0.0)	0.0% (0.0)	0.1% (1.1)
Juvenile Sex Offender Treatment*	0 (0.0%)	1 (0.3%)	0 (0%)	0.0% (0.0)	0.0% (0.9)	0.0% (0.0)

Note. PE used at least once throughout the episode = Number of youth (and percept of sample) that had each practice element endorsed at least once throughout the entire episode (i.e., yes or no). Percent of months PE was used = Percent of MTPS reporting months within a youth's entire treatment episode that included each PEs, averaged (with standard deviation) across the entire dataset. *PEs commonly written-in by therapists

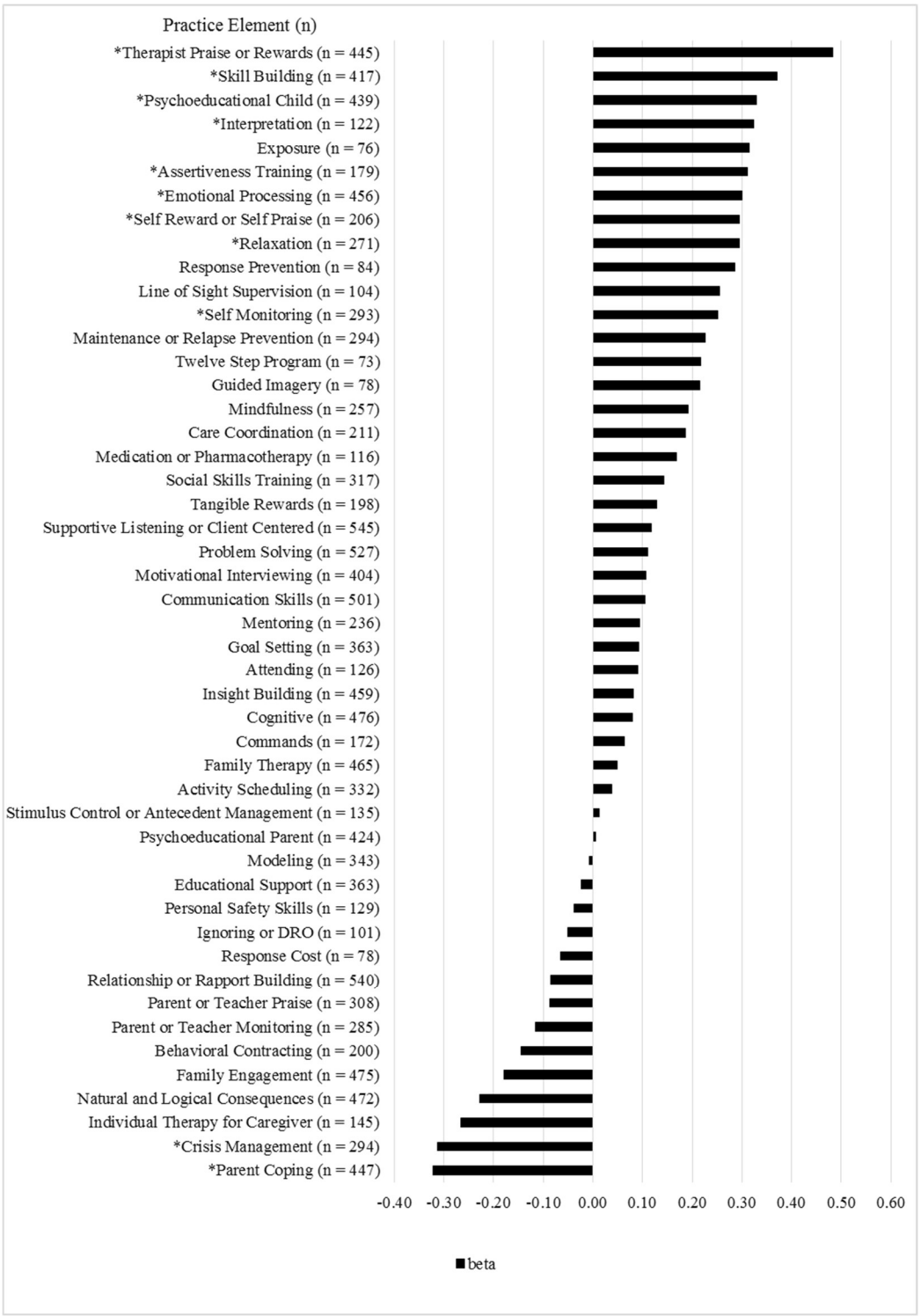


Figure 3. Graphic Depiction of Relationship between each Individual Practice Element and Client Average Substance Use Progress Rating as Reflected in Beta Values. Practice Elements are included if they appeared in more than 10% of cases. n = number of cases. * $p < .05$.

CHAPTER 5: DISCUSSION

Summary of Aim 1: Geographic Isolation

This is the first study to examine (a) how geographic isolation relates to trajectories of therapeutic progress for substance use and (b) whether the use of family interventions and family involvement in treatment predicts youth outcomes in a usual care public mental health setting. Contrary to the hypothesis, there was no evidence that average substance use progress ratings were lower in geographically isolated areas. This finding held no matter how "geographic isolation" or "rurality" was defined in the present study. In fact, under one definition of geographic isolation, there was a statistically significant finding in the opposite direction, such that youth considered geographically isolated had higher average substance use progress ratings than non-isolated youth. Similarly, an additional post-hoc analysis using a different criterion measure found that the probability of a successful discharge at the end of the selected treatment episode was greater for geographically isolated youth compared with those who are non-isolated. No youth or therapist covariates examined within the context of geographic isolation were significant predictors of average substance use progress rating or rate of youth improvement. Given that geographic isolation was not a significant predictor of treatment outcomes in major study analyses (Baron & Kenny, 1986), the mediator model for study aim 3 was not examined.

Summary of Aim 2: Family Interventions and Family Involvement in Treatment

There were no statistically significant differences in the use of family interventions for geographically isolated and non-isolated youth. Contrary to the hypothesis, on average, families of geographically isolated youth were more frequently involved in treatment than non-isolated families. Furthermore, when both family interventions and family involvement in treatment

were considered in the MLM alongside individual interventions and monthly individual involvement in treatment, only individual interventions and monthly individual involvement in treatment were significant predictors of average substance use progress rating. An examination of family interventions and involvement, without the influence of individual interventions or monthly individual involvement in treatment, found an increased number of family interventions used per episode was a significant predictor of youth improvement, along with older age. However, the proportion of months families were involved in treatment did not predict youth outcomes when considered independently in the model or with other variables. Exploratory analyses that examined family PDE and individual PDE scores point to similar results. Family PDE and individual PDE scores developed using stringent criteria (i.e., appearing in 30% or more of treatment protocols) found that only an increased number of individual PDE used per episode was a significant predictor of improvement in average substance use progress rating. Using this criterion, an increase in the use of family PDE during the episode was not a significant predictor of improvement in average substance use progress ratings, even when considered individually. Similarly, exploratory analyses found that individual PEs that predicted youth improvement were both from the coping and self-control factor (Orimoto et al., 2012) and considered individual PDE. Family PDE and individual PDE scores that were developed using less strict criteria (i.e., appearing in 10% or more of treatment protocols, thus including a greater number of PEs), were also examined. Both an increased use of family PDE and individual PDE, appearing in 10% or more of protocols, across the episode were significant predictors of improvement in average substance use progress ratings. No other client or therapist variables were significant predictors of average substance use progress ratings or rate of improvement.

Geographic Isolation

The finding that geographically isolated youth did not experience poorer treatment outcomes in comparison to their non-isolated peers aligns with McGarvey et al. (2014) and Ruiz et al. (2005), who found no differences in treatment outcomes between isolated and non-isolated youth receiving treatment for ASU in outpatient and residential settings, respectively. However, it conflicts with Hall and colleagues' (2008) findings of greater improvement for urban youth compared with rural youth receiving treatment for ASU. Some of the present study's findings also contradict prior evidence that more isolated youth achieve substance use treatment outcomes that are similar to or poorer than those who are non-isolated (Hall et al., 2008; McGarvey et al., 2014; Ruiz et al., 2005). These findings also challenge theoretical assumptions that indicate geographically isolated families have increased difficulty accessing and engaging in treatment in comparison to non-isolated families (Heflinger & Christians, 2006; Human & Wasem, 1991; Lenardson & Gale, 2007; Larson et al., 2012; Jameson et al., 2009; Pullman et al., 2010).

These findings suggest that the experience of geographic isolation in Hawai‘i may not be directly comparable to the experience of isolation elsewhere in the U.S., and points to possible strengths and protective factors for these youth and their families. Much of the existing research on rural mental health has been conducted in the Midwest and Appalachia and highlights values thought to be prominent in rural agricultural families of the continental U.S., such as a tradition of independence and handling one's own problems (Human & Wasem, 1991; Jameson & Blank, 2007). These values, accompanied by attitudes about help seeking, concern about stigma and anonymity of accessing care, reliance of informal supports, and a mistrust of professionals have been considered deterrents to rural residents accessing treatment services for youth (Dew et al.,

2007; Heflinger & Christens, 2006; Larson et al., 2012; Murry, Heflinger, Suiter, & Brody, 2011; Pullman et al., 2010). However, these rural continental U.S. values and attitudes might not translate to Hawai‘i, given its unique historical, community, and cultural context. For example, the prosocial behaviors and values of Hawai‘i’s indigenous people, such as aloha (love, kindness, compassion), kōkua (assist, help), and laulima (group of people working together) in both geographically isolated and non-isolated communities might be related to an increased willingness to seek and receive help (McCubbin & Marsella, 2009; Pukui & Elbert, 1986).

Clearly defined policies and procedures within CAMHD (CAMHD, 2012) for the provision of services statewide might also relate to differences in the current study’s findings and existing research on rural mental health conducted in the continental U.S. The extent to which the delivery of services is consistent across the state by CAMHD might have lessened potential disparities in treatment outcomes between geographically isolated and non-isolated areas. For example, the greater improvement found in this study for geographically isolated youth compared with non-isolated youth for one definition of geographic isolation and one of the outcomes examined may be due to the IIH nature of the study setting, where services are often provided to youth in the home or in other community settings (Daleiden et al., 2010). It has been estimated that 80% of these face-to-face treatment services occur in a non-clinic setting (Daleiden et al., 2010). Thus, despite the barriers geographically isolated families might face related to the accessibility and availability of clinic based services (Dew et al., 2007; Jameson & Blank, 2007; Pullman et al., 2010), therapists providing IIH (i.e., meeting youth and families in home and community settings) to both isolated and non-isolated families likely reduce or diminish the transportation barriers geographically isolated families might otherwise experience.

The contradictory findings of this study and different outcomes under various definitions of geographic isolation reinforces the need for careful consideration of the way rurality and isolation are defined in heath service research (Hart et al., 2005).

Family Interventions and Family Involvement

Findings for the use of family interventions and family involvement in treatment both support and contradict treatment findings for adolescent substance use from prior efficacy and effectiveness studies. Previous research has found support for family-based treatment modalities in the evidence-base literature for ASU (Hogue et al., 2014; Waldron & Turner, 2008), including that usual care family therapy is more effective in reducing alcohol and drug use in adolescents when compared with general usual care (Hogue et al. 2015). In the present study, when family interventions and family involvement were considered in the MLM along with individual interventions and monthly individual involvement in treatment, only the increased use of individual interventions and monthly individual involvement in treatment were significant predictors of improvement in average substance use progress rating. This finding held when a stricter definition of family PDE and individual PDE scores were examined in supplemental analyses such that only an increased use of individual PDE during the episode was a significant predictor of improvement in average substance use progress ratings. When examined independently of individual coping skills and the dichotomized individual monthly involvement in treatment, an greater use of family interventions, but not the proportion of months a family was involved in treatment significantly predicted improvement in average substance use progress rating. This finding held with the more inclusive definition of individual PDE and family PDE scores that were examined. It is likely that since family and individual scores were correlated,

when entered together in the model, only individual interventions were significant, given the shared variance between them.

The IIH nature of the sample might relate to differences in findings between this and prior studies. For example, a study of usual care, which was a comparison of usual care family therapy and standard treatment as usual (Hogue et al., 2014a; 2014b; Hogue et al., 2015), was conducted with a sample of urban youth receiving outpatient treatment services. The present study differed from Hogue and colleagues (2014a; 2014b; 2015) in that it included a sample of youth across varying geographic areas and served youth in both home and community settings. The IIH therapists in this sample might select and treat families in a different manner than outpatient clinic-based therapists, which might then relate to differences in treatment outcomes.

That individual and family intervention scores developed both through confirmatory factor analysis and by PDE definitions were all significant predictors of average substance use progress ratings suggests that it is not so much what practice is applied, but how many practices were applied that leads to improvement in treatment outcomes. This multiple PE use approach suggests therapists might be using a wide range of practices to target a given problem (or set of problems) without consideration for the exact extent to which that practice might effectively address the target problem. This is consistent with findings from other examinations of usual care treatment outcomes for youth with both externalizing (Izmirian, 2016; Orimoto, 2013) and internalizing (Milette-Winfree & Mueller, 2017) concerns. This finding suggests therapists might be using and thus endorsing a wide range of practices but begs the question about the fidelity with which these practices are applied.

The extent to which the practices included in the family intervention scores developed through either factor analysis or PDE definitions overlap with core elements of family therapy approaches might also have related to study findings. While both of the family intervention scores in the current study included practice elements used to address parenting strategies (e.g., natural and logical consequences, modeling) and family interactions (e.g., communication skills), as well as treatment engagement and retention (e.g., family engagement), which have all been indicated as important aspects of family therapy approaches (Hogue & Liddle, 2009), other core elements of family treatment models were not adequately captured. For example, such techniques include understanding the referral problem and developing treatment goals using a family-focused lens and improving patterns of family interaction were not examined as part of the current study.

Without a careful examination of specific mechanisms of change, it is unclear what aspects of manualized treatment are the critical ingredient(s) toward improving youth outcomes. Some work suggests that coping behaviors (Myers, Brown, & Mott, 1993) and problem solving (Myers & Brown, 1990a, 1990b) might relate to improved outcomes in treatment for ASU. Supplemental exploratory findings examining practice elements separately also identified that the use of particular single practice elements were related to a positive and sizable beta. These PEs were typically those designed for use with youth individually (e.g., skill building, psychoeducational child, assertiveness training, self-rewards or self-praise). In contrast, the use of the practice elements, parent coping, family engagement, and individual therapy for caregiver all had a sizable negative beta, which likely influenced any potential family intervention effect. In particular, when examined separately, parent coping was a significant predictor of decreased

average substance use progress rating. Altogether, this suggests family intervention strategies might be employed for specific situations, such as when a youth is progressing poorly in treatment. This finding could also suggest that under some circumstances, the use of family strategies might indicate that family-related barriers are impairing youth treatment progress. It is possible that in RCTs, the family interventions are a consistent focus of treatment, while in usual care, family focused intervention strategies are emphasized more when the family is not functioning well. Furthermore, RCTs with a family focus likely include families who are more ready and able to benefit from treatment.

The use of family therapy approaches has received a robust record of treatment efficacy and effectiveness (see reviews by Waldron & Turner, 2008 and an update by Hogue et al., 2014 for summaries). However, other approaches, such as cognitive-behavior therapy have also been found to be "well-established" for ASU. Findings from the current study suggest that both individual youth as well as family approaches appear to have a role in youth treatment outcomes. It is possible that there are particular circumstances under which individual approaches, family approaches, or a combination thereof are most effective in usual care. For example, certain youth in usual care cases might benefit from a carefully planned family treatment approach and other usual care clients might receive family approaches only in reaction to challenging family circumstances (e.g., an impaired parent-child relationship).

Client and Therapist Variables

In some of the MLMs, age was a significant predictor of average substance use progress ratings, such that older youth had higher scores. Outside of age, no client variables predicted improvement in the intercept. This is consistent with Hogue, Henderson, and Schmidt (2017),

who found that demographic variables (i.e., gender and ethnicity) were not related to change in substance use. It is likely that it was difficult to observe effects from client demographic variables due to the low variance accounted for at the client level and the low therapist to client ratio (i.e., 201:634).

Despite a large amount of variance occurring on the therapist level, this study found no therapist-specific variables were significant predictors of improvement of average substance use progress rating or rate of improvement for the substance use progress rating. Previous research that investigated these CAMHD therapist variables (i.e., professional specialty, degree, licensure status, number of degrees) found similar non-significant predictors in the context of significant variance at this level of the model (Izmirian, 2016; Love, 2014, Orimoto et al., 2013; Wilkie, 2016). It might have been difficult to observe therapist level effects due to a lack of variance within some of the therapist-level variables. For example, the majority of therapists had a master's degree and were classified as a qualified mental health professional. Another reason it might have been difficult to observe therapist effects is that some of the variables (e.g., professional specialty) were derived from the therapist's highest degree. In addition, other therapist variables might be related to the application of certain practice elements and therapeutic styles, such as theoretical orientation, prior training in and fidelity of EBPs, and therapeutic alliance, that were not collected in the present study. For example, community therapist's knowledge of EBPs for substance use and training in these EBPs have been related to their adherence to these practices (Henggeler, Chapman, Rowland, Sheidow, & Cunningham, 2013). Hogue and colleagues (2012; 2015) found usual care family therapists reported stronger allegiance and skill in family therapy techniques and that their clients had a greater reduction in

drug and alcohol use in comparison to non-family usual care therapists who reported a greater use of CBT and MI approaches. Additionally, therapeutic alliance with parents and youth has been found to be related to improvement in substance use and externalizing problems (Hogue, Dauber, Stambaugh, Cecero, & Liddle, 2006). There might also be specific therapist strengths that could not be observed within the current data set, such as particular efforts to provide services to geographically difficult to reach populations, and therapist-matching variables, such as whether or not a particular therapist was working within a community for which he or she is also a member. Given that this study did not include these constructs or other therapist characteristics (e.g., years of service, knowledge about evidence-based practice) that might influence the application of different therapeutic techniques, the present study cannot speak on the relationship between these variables and youth improvement on substance use progress ratings or unique therapist efforts to treat geographically isolated and non-isolated youth. It might be better to collect therapist demographic and professional information directly from the therapists to better be able to categorize their professional backgrounds and training experience. Furthermore, usual care youth mental health systems should make efforts to track both therapist demographic and professional characteristics as well as their preservice and continuing education training experiences in order to further understand how these factors relate to youth substance use treatment outcomes, and to facilitate improvements to the factors that are amenable to modification.

Limitations

Several limitations warrant mention. First, this study utilized a number of definitions of geographic isolation, some of which overlap with the definitions of rurality within the State of

Hawai‘i. A challenge within the study of rural mental health is a lack of consensus on any particular definition of rurality (Hart et al., 2005), and it is possible that other definitions of rurality and isolation not utilized in the present study might have led to different findings. While this study attempted to capture some aspects of extreme isolation through the examination of a CAMHD IIH rural code, this study cannot speak to youth and their families who are unable to participate in treatment services because of barriers to care in their service area.

A second limitation of this study is the manner with which substance use was defined. This study attempted to include as many youth as possible to maximize the sample size. Thus, youth were included if they had substance use targeted at least once during their treatment episode. This study attempted to control for diagnostic variability, and variation in the amount of substance use targeting across the episode by including variables for any substance use, any mood, or any disruptive behavior diagnosis across the treatment episode, and whether youth received the substance use treatment target once or more during the episode, all of which were nonsignificant. This study also examined another outcome variable, the probability of successful discharge at the end of the treatment episode, for which findings were consistent with the major study outcomes. While it is possible that variability in the amount of substance use targeting during the episode might relate to differences in the application of family PEs and family involvement for youth, the consistent findings across outcome measures examined lends support to the manner substance use was defined in the present study.

Another limitation of this study is the reliance of a single treatment target to define the outcome measure. Whereas prior studies have examined treatment progress through a construct developed through multiple treatment targets and associated progress ratings for those targets

(Love et al., 2015; Orimoto et al., 2014, Milette-Winfree & Mueller, 2017; Wilkie, 2016), the current study relied on a single treatment target, substance use progress rating. While reliance on a single item outcome is a weakness of this study it is important to note that findings are consistent with patterns of treatment change (i.e., significant linear and quadratic time effects) typically observed during usual care (e.g., Wilkie et al., 2016). Additionally, other outcome measures examined, specifically the probability of successful discharge at the end of the treatment episode, did not indicate poorer outcomes for geographically isolated youth as compared with non-isolated youth. Indeed, the probability of successful discharge was greater for geographically isolated youth compared with non-isolated youth.

Fourth, while a combination of PracticeWise coding and exploratory factor analysis completed on the MTPS (Orimoto et al., 2013) created the family and individual intervention scores used in this study, the scores developed were not exhaustive and might differ from groupings of practice elements utilized within specific family therapy manualized treatment approaches. Practice elements used in treatment, client progress data, and the selection of who was involved in treatment were reported on a monthly basis. Thus, the endorsement of a particular practice element or involvement of a treatment team member does not reflect clear information on the amount of time that was spent on that practice during a given month or treatment session, or how often family members were involved within a given month. Given that the MTPS is a therapist report measure, the fidelity with which a particular practice element was applied is also unclear. It is possible that there is differential fidelity to the application of family and individual PEs such that individual PEs are more easily applied by usual care therapists.

Fifth, a large amount of variance was found on the therapist level, however, that variance was not accounted for by the therapist demographic and professional information included in the present sample. The ability to account for therapist level variance might have been improved had additional therapist-related variables been include in this study (e.g., race, gender, years of experience, theoretical orientation, therapeutic alliance skills, prior training in EBP). In addition, while Borntrager and colleagues (2013) showed therapist report of MTPS practice elements had adequate validity, they also found therapists tended to over-report their use of practice elements and other research indicates that therapist self-report can be inconsistent with observations of therapist behavior (e.g., Garland, Brookman-Frazee, Hurlburt et al., 2010; Hurlburt, Garland, & Nguyen, 2010). Therapists might be selecting practices based on assumptions about how their work will be perceived (e.g., selecting a larger range of practice elements than what was actually utilized) instead of what was actually completed during that treatment month.

Sixth, the low ratio of clients to therapists in this study likely made it difficult to observe significant findings on the client level, since much of the client variance was likely captured at the therapist level. Thus, while it is possible that some of the client variables of interest, including the major predictors of interest in this study, might have an influence on youth treatment outcomes, it was difficult to observe effects given the low client to therapist ratio.

Future Directions and Implications

Barriers that geographically isolated families commonly experience regarding accessibility and availability of treatment services highlight the need for more examination of how to best serve these youth (Heflinger & Christians, 2006; Jameson & Blank, 2007). However, there have been few empirical investigations comparing geographically isolated and non-isolated

youth receiving treatment for substance use. Furthermore, few existing studies examining rural youth include an urban comparison group (e.g., Boarders & Booth, 2007; Brown et al., 2007; Okamoto et al., 2009). A strength of this study was that it compared geographically isolated youth receiving treatment within a large public mental health system, with their non-isolated peers. Given that results from this study were contrary to hypotheses, such that geographically isolated youth are doing similar to, and sometimes better than their non-isolated counterparts, future studies should attempt to fully elucidate the strengths, protective factors, and aspects of resiliency that lead to improved outcomes for geographically isolated youth. Future studies should collect qualitative data, in addition to quantitative measures, from both geographically isolated and non-isolated families and therapists, to shed further light on protective factors that help support isolated youth who are considered to have increased barriers and adversity when trying to access care. In addition to identifying specific practice elements that predict youth treatment outcomes, future studies should also carefully examine the baseline youth demographic, therapist, and service ingredients that can help to determine how to tailor interventions for often difficult to treat populations (Hogue et al., 2017)

Another strength of this study is the utilization of a number of different definitions of geographic isolation. A lack of standard definitions in the area of rural mental health research makes comparisons between studies challenging and the results from the current study, which indicated geographically isolated youth are doing similar to or better than their non-isolated peers, point to the importance of careful consideration of definitions of rurality and isolation when attempting to categorize different geographic areas. Without clear agreement on how to

best capture isolation and the barriers isolated families experience, efforts should be made to gain consistency with the definitions used in future studies.

Given challenges with practice element proportion scores used in prior studies (e.g., Orimoto et al., 2013, Love et al., 2014), as well as the study emphasis of examining family-focused interventions, this study developed practice element scores that averaged the total number of a particular type of practice (e.g., family, individual, PDE) used during the episode across the number of months a youth was treated, then included a separate score in the model for comparison and control purposes. While it was not a major focus of the study, an inherent limitation of using this score was that it did not control for the total number of practices a youth received in a given month. Future studies should continue to explore under what conditions the use of different practice element score definitions are most appropriate.

Furthermore, the finding that both individual and family interventions are a significant predictor of youth outcomes, the "multiple PE use approach", is consistent with prior usual care research (e.g., Orimoto et al., 2013) and indicates future work is still needed to determine what works for whom, and under what constraints. As usual care settings integrate electronic health records as part of their standard practice of care, future studies can better examine how the use of family interventions and family involvement in treatment, and more broadly how a specific selection of practices within a given time frame, relates to youth outcomes with the recording of more detailed, session-by-session information.

While there is a broad need for systematic research on usual care settings, given the barriers experienced by youth who are more geographically isolated, particularly the challenges these youth might experience when trying to access specialty care for substance use, it is

imperative that future studies examine usual care within geographically isolated settings. This will help to bridge the gap between research and practice and improve dissemination and implementation efforts for these often underserved youth.

There are limitations inherent to this study and a clear need for future research in this area. Overall, findings suggest the use of individual interventions, monthly individual involvement in treatment, and youth older age are significant predictors of improvement in average substance use progress ratings. In addition, results indicate that under some definitions of geographic isolation, geographically isolated youth have higher average substance use progress ratings than their non-isolated peers. The use of more individual youth coping interventions was consistently a significant predictor of improvement in average substance use progress ratings. These results also indicate that the use of more family interventions (but not involvement) also leads to higher average substance use progress ratings during the episode, though this effect was smaller, likely due to the correlated nature of family and individual practice scores. Taken together, these results suggest that it might not be the type of practices youth receive, but that amount of practices received during the study episode that affect treatment outcomes. Given the barriers geographically isolated families experience, and the importance of identifying specific practices that help both geographically isolated and non-isolated youth with substance youth challenges improve, it is paramount that future research determine what characteristics of usual care help to best support youth who reside across varying geographic areas.

Appendix A: Monthly Treatment and Progress Summary (MTPS) Form (2008)

SERVICE PROVIDER MONTHLY TREATMENT & PROGRESS SUMMARY
Child and Adolescent Mental Health Division (CAMHD)

Instructions: Please complete and electronically submit this form to CAMHD by the 5th working day of each month (summarizing the time period of 1st to the last day of the previous month). The information will be used in service review, monitoring, planning and coordination in accordance with CAMHD policies and standards. Mahalo!

Client Name:	CR #:	DOB:
Month/Year of Services:	Eligibility Status:	Level of Care (one per form):
Axis I Primary Diagnosis:	Axis I Secondary Diagnosis:	Axis I Tertiary Diagnosis:
Axis II Primary Diagnosis:	Axis II Secondary Diagnosis:	

Service Format (circle all that apply):
Individual Group Parent Family Teacher Other: _____

Service Setting (circle all that apply):
Home School Community Out of Home Clinic/Office Other: _____

Service Dates:																

Targets Addressed This Month (*number* up to 10):

	Activity Involvement		Community Involvement		Hyperactivity		Positive Peer Interaction		Shyness
	Academic Achievement		Contentment, Enjoyment, Happiness		Learning Disorder, Underachievement		Phobia/Fears		Sleep Disturbance
	Adaptive Behavior/Living Skills		Depressed Mood		Low Self-Esteem		Positive Thinking/ Attitude		Social Skills
	Adjustment to Change		Eating, Feeding Problems		Mania		Pregnancy Education/ Adjustment		Speech and Language Problems
	Aggression		Empathy		Medical Regimen Adherence		Psychosis		Substance Use
	Anger		Enuresis, Encopresis		Occupational Functioning/Stress		Runaway		Suicidality
	Anxiety		Fire Setting		Oppositional/ Non-Compliant Behavior		School Involvement		Traumatic Stress
	Assertiveness		Gender Identity Problems		Peer Involvement		School Refusal/Truancy		Treatment Engagement
	Attention Problems		Grief		Peer/Sibling Conflict		Self-Control		Willful Misconduct, Delinquency
	Avoidance		Health Management		Personal Hygiene		Self-Injurious Behavior		Other:
	Cognitive-Intellectual Functioning		Housing/Living Situation		Positive Family Functioning		Sexual Misconduct		Other:

CR # _____ (please repeat the number here)

Progress Ratings This Month (check appropriate rating for any target numbers endorsed as targets):

#	Deterioration < 0%	No Significant Changes 0%-10%	Minimal Improvement 11%-30%	Some Improvement 31%-50%	Moderate Improvement 51%-70%	Significant Improvement 71%-90%	Complete Improvement 91%-100%	Date (If Complete)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Intervention Strategies Used This Month (check all that apply):

	Activity Scheduling		Emotional Processing		Line of Sight Supervision		Personal Safety Skills		Stimulus or Antecedent Control
	Assertiveness Training		Exposure		Maintenance or Relapse Prevention		Physical Exercise		Supportive Listening
	Attending		Eye Movement, Tapping		Marital Therapy		Play Therapy		Tangible Rewards
	Behavioral Contracting		Family Engagement		Medication/ Pharmacotherapy		Problem Solving		Therapist Praise/Rewards
	Biofeedback, Neurofeedback		Family Therapy		Mentoring		Psychoeducation, Child		Thought Field Therapy
	Care Coordination		Free Association		Milieu Therapy		Psychoeducation, Parent		Time Out
	Catharsis		Functional Analysis		Mindfulness		Relationship or Rapport Building		Twelve-Step Program
	Cognitive		Goal Setting		Modeling		Relaxation		Other:
	Commands		Guided Imagery		Motivational Interviewing		Response Cost		Other:
	Communication Skills		Hypnosis		Natural and Logical Consequences		Response Prevention		Other:
	Crisis Management		Ignoring/Differential Reinforcement of Other Behavior		Parent Coping		Self-Monitoring		
	Cultural Training		Individual Therapy for Caregiver		Parent/Teacher Monitoring		Self-Reward/ Self-Praise		
	Discrete Trial Training		Insight Building		Parent/Teacher Praise		Skill Building		
	Educational Support		Interpretation		Peer Pairing		Social Skills Training		

CR # _____ (please repeat the number here)

Psychiatric Medications (List All)	Total Daily Dose	Dose Schedule	Check if Change	Description of Change
_____	_____	_____	☐	_____
_____	_____	_____	☐	_____
_____	_____	_____	☐	_____
_____	_____	_____	☐	_____
_____	_____	_____	☐	_____

Projected Discharge Date: _____ ☐ Check if Discharged During Current Month

IF YOUTH WAS DISCHARGED THIS MONTH, PLEASE COMPLETE ITEMS A & B:

A. Discharge Living Situation (check one):

☐ Home ☐ Foster Home ☐ Group Care ☐ Residential Treatment
☐ Institution/Hospital ☐ Jail/Correctional Facility ☐ Homeless/Shelter ☐ Other:_____

B. Reason(s) for Discharge (check all that apply):

☐ Success/Goals Met ☐ Insufficient Progress ☐ Family Relocation
☐ Runaway/Elopement ☐ Refuse/Withdraw ☐ Eligibility Change ☐ Other:_____

Outcome Measures: Optional. If you have any of the following data, please report the most recent scores:

CAFAS (8 Scales): (1-School:) (2-Home:) (3-Community:) (4-Behavior Toward Others:) (5-Moods/Emotions:) (6-Self-Harm:) (7-Substance:) (8-Thinking:) (Total:)			Date:
CASII/CALOCUS (Total):	CASII/CALOCUS (Level of Care):		Date:
CBCL (Total Problems T):	CBCL (Internalizing T):	CBCL (Externalizing T):	Date:
YSR (Total Problems T):	YSR (Internalizing T):	YSR (Externalizing T):	Date:
TRF (Total Problems T):	TRF (Internalizing T):	TRF (Externalizing T):	Date:
Arrested During Month? (Y/N):	School attendance (% of days):		

Comments/Suggestions (***attach additional sheets if necessary***):

Provider Agency & Island: _____ Clinician Name and ID#:_____
Provider Supervisor Signature: _____ Clinician Signature: _____
Submitted to CAMHD (date): _____ Care Coordinator: _____

Appendix B: Monthly Treatment Progress Summary (2008) Instructions and Codebook

DOH Child and Adolescent Mental Health Division
Instructions and Codebook for Provider Monthly Treatment and Progress Summary
Effective July 1, 2008

The instructions and codebook are to be used in conjunction with the CAMHD Service Provider Monthly Treatment and Progress Summary form. This codebook defines the numerous terms and possible responses necessary to accurately complete the form. For questions regarding these definitions or the use of the Monthly Treatment and Progress Summary, please contact the Clinical Services Office at 733-9349.

Instructions

Please complete and electronically submit to CAMHD the Monthly Treatment and Progress Summary by the 5th working day of the month. The summary should pertain to the previous month's services. This form should be completed by the clinician who is most familiar with the current status of the youth and family and with the services provided during the month. When necessary, the responding clinician should gather information from other provider team members to assure the most accurate description possible. Once completed by the clinician, the form should be reviewed and signed by a qualified supervisor.

At the top section, please write the Client Name, CR Number, Date of Birth (DOB), Home School, School Complex, Eligibility Status [i.e., Educationally Supportive (IDEA), Support for Emotional and Behavioral Development (SEBD), Mental Health Only], Axis I Primary Diagnosis, Axis I Secondary Diagnosis, Axis I Tertiary Diagnosis, Axis II Primary Diagnosis, Axis II Secondary Diagnosis, Level of Care, and Month/Year of Services. If some Diagnosis fields do not apply to the youth, please leave those fields blank. The Month/Year of Services refers to the month in which the service was provided, not the date the Monthly Provider Summary was completed. For example, if the report is submitted in the first week of June, the Month/Year of Services would read "May," because the services were delivered in May. For youth receiving more than one level of care during the month, please complete a separate form for each.

Under Service Format, please indicate whether services were delivered in the following manner (more than one format can be selected):

Individual –Working with youth directly
Group –Working with youth along with other youths receiving services
Parent –Working directly with parents or caregivers, with youth not present
Family – Working with parents or caregivers and youth together. Can include other family members
Teacher – Working with a teacher directly
Other – Another format not specified above; please write description

Under Service Setting, please note whether services were delivered in the following locations (more than one setting can be selected):

Home –Working with youth or family members in the youth's home
School –Working with youth or professionals in the youth's educational setting, other than in the context of an IEP/MP meeting
Community – Working with youth or others in the youth's community/neighborhood
Out of Home – Working with the youth or family in a residential facility
Clinic/Office – Working with the youth or family in a clinical office
Other – Another setting not specified above; please write description

For Service Dates, please provide the dates for each service provided during that month. If additional space is required, please continue writing dates in the area below the boxes provided. If the service was provided out of home (i.e., continuously), please provide start and end dates for that month's services and put the word "to" in between in one of the boxes.

Targets

Targets are the strengths and needs being addressed as part of the mental health services for that youth.

When completing the Targets Addressed This Month, please put numbers (1, 2, 3…) rather than checkmarks (X, ✔) to the left of each target addressed. This is so that progress ratings in the next section can be attached to each target. For example, if "Academic Achievement" was targeted, place a "1" in the box to the left of that target on the form. Numbers do not need to reflect any particular order. If more than 10 targets were addressed during the month, please provide only those you feel are the 10 most important. If a target was addressed for which there is no option, please number the "other" box, and write in the target.

The list of treatment targets is intended to provide a summary of strengths and needs that are commonly targeted for change during mental health service provision. These problem areas are NOT diagnostic descriptions and the primary targets for treatment may change over time for a particular youth. For example, when treating a youth with an eating disorder, treatment may target eating/feeding behavior at one point, but target medical regimen adherence or positive family functioning on other occasions. These treatment targets are for progress summary purposes and should NOT replace the detailed specification of goals and objectives as part of the treatment planning process.

Definitions of Targets

1. **Academic Achievement** – Issues related to general level or quality of achievement in an educational or academic context. This commonly includes performance in coursework, and excludes cognitive-intellectual ability/capacity issues (#11) and specific challenges in learning or achievement (#24)
2. **Activity Involvement** – Issues related to general engagement and participation in activities. Only code here those activities that are not better described by the particular activity classes of school involvement (#40), peer involvement (#30), or community involvement (#12).
3. **Adaptive Behavior/Living Skills** – Skills related to independent living, social functioning, financial management, and self-sufficiency that are not better captured under other codes

such as personal hygiene (#33), self-management/self-control (#43), social skills (#47), housing/living situation (#22), or occupational functioning/stress (#28).

4. **Adjustment to Change** – Issues related to a youth's global response to a life transition or specific challenge (e.g., change of school, living situation, treatment transition or discharge, etc.).
5. **Aggression** – Verbal and/or physical aggression, or threat thereof, that results in intimidation, physical harm, or property destruction.
6. **Anger –** Emotional experience or expression of agitation or destructiveness directed at a particular object or individual. Common physical feelings include accelerated heartbeat, muscle tension, quicker breathing, and feeling hot.
7. **Anxiety** – A general uneasiness that can be characterized by irrational fears, panic, tension, physical symptoms, excessive anxiety, worry, or fear.
8. **Assertiveness** – The skills or effectiveness of clearly communicating one's wishes. For example, the effectiveness with which a child refuses unreasonable requests from others, expresses his/her rights in a non-aggressive manner, and/or negotiates to get what s/he wants in their relationships with others.
9. **Attention Problems** – Described by short attention span, difficulty sustaining attention on a consistent basis, and susceptible to distraction by extraneous stimuli.
10. **Avoidance** – Behaviors aimed at escaping or preventing exposure to a particular situation or stimulus.
11. **Cognitive-Intellectual Functioning** – Issues related to cognitive-intellectual ability/capacity and use of those abilities for positive adaptation to the environment. This includes efforts to increase IQ, memory capacity, or abstract problem-solving ability.
12. **Community Involvement** – Issues related to the amount of involvement in specific community activities within the child's day.
13. **Contentment/Enjoyment/Happiness –** Refers to issues involving the experience and expression of satisfaction, joy, pleasure, and optimism for the future.
14. **Depressed Mood** – Behaviors that can be described as persistent sadness, anxiety, or "empty" mood, feelings of hopelessness, guilt, worthlessness, helplessness, decreased energy, fatigue, etc.
15. **Eating/Feeding Problems**– Knowledge or behaviors involved with the ingestion or consumption of food. May include nutritional awareness, food choice, feeding mechanics (e.g., swallowing, gagging, etc.), and social factors relating with eating situations.
16. **Empathy** – Identifications with and understanding of another person's situation, feelings, and motives.
17. **Enuresis/Encopresis** – Enuresis refers to the repeated pattern of voluntarily or involuntarily passing urine at inappropriate places during the day or at night in bed or clothes. Encopresis refers to a repeated pattern of voluntarily or involuntarily passing feces in inappropriate places.
18. **Fire Setting** – Intentionally igniting fires.
19. **Gender Identity Problems –** Issues related with a youth's self-concept or self-understanding involving gender roles and social behaviors in relation to their biological sex. This does not address self-concept issues involving sexual orientation, which would be coded as "other."
20. **Grief** – Feelings associated with a loss of contact with a significant person in the youth's environment (e.g., parent, guardian, friend, etc.).

21. **Health Management** – Issues related to the improvement or management of one's health, inclusive of both physical illness and fitness. In addition to dealing with the general development of health-oriented behavior and management of health conditions, this target can also focus on exercise or lack of exercise.
22. **Housing/Living Situation** – Refers to finding or stabilizing an appropriate living situation for a youth.
23. **Hyperactivity** – Can be described by fidgeting, squirming in seat, inability to remain seated, talking excessively, difficulty engaging in leisure activities quietly, etc.
24. **Learning Disorder, Underachievement** – Refers to specific challenges with learning or educational performance that are not better accounted for by cognitive-intellectual functioning (#11) or general academic achievement (#1).
25. **Low Self-Esteem** – An inability to identify or accept his/her positive traits or talents, and accept compliments. Verbalization of self-disparaging remarks and viewing him or herself in a negative manner.
26. **Mania** – An inflated self-perception that can be manifested by loud, overly friendly social style that oversteps social boundaries, and high energy and restlessness with a reduced need for sleep.
27. **Medical Regimen Adherence –** Knowledge, attitudes, and behaviors related to regular implementation procedures prescribed by a health care professional. Commonly include lifestyle behaviors (e.g., exercise, nutrition), taking medication, or self-administration of routine assessments (e.g., taking blood samples in a diabetic regimen).
28. **Occupational Functioning/Stress** – Issues related to career interests, seeking employment, obtaining work permits, job performance, or managing job stress or strain that are not better characterized under other targets (e.g., anxiety).
29. **Oppositional/Non-Compliant Behavior** – Behaviors that can be described as refusal to follow adult requests or demands or established rules and procedures (e.g., classroom rules, school rules, etc.).
30. **Peer Involvement** – A greater involvement in activities with peers. Activities could range from academic tasks to recreational activities while involvement could range from working next to a peer to initiating an activity with a peer.
31. **Peer/Sibling Conflict** – Peer and/or sibling relationships that are characterized by fighting, bullying, defiance, revenge, taunting, incessant teasing and other inappropriate behaviors.
32. **Phobia/Fears** – Irrational dread, fear, and avoidance of an object, situation, or activity.
33. **Personal Hygiene** – Challenges related to self-care and grooming.
34. **Positive Family Functioning** – Issues related with healthy communication, problem-solving, shared pleasurable activities, physical and emotional support, etc. in the context of an interaction among multiple persons in a family relation, broadly defined.
35. **Positive Peer Interaction** – Social interaction and communication with peers that are pro-social and appropriate. This differs from peer involvement (#30) in that it focuses on interactional behavior, styles, and intentions, whereas peer involvement targets actual engagement in activities with peers regardless of interactional processes.
36. **Positive Thinking/Attitude –** This target involves clear, healthy, or optimistic thinking, and involves the absence of distortions or cognitive bias that might lead to maladaptive behavior.
37. **Pregnancy Education/Adjustment** – Issues related to helping a pregnant youth prepare and adjust to parenthood.

38. **Psychosis** – Issues related to atypical thought content (delusions of grandeur, persecution, reference, influence, control, somatic sensations), and/or auditory or visual hallucinations.
39. **Runaway** – Running away from home or current residential placement for a day or more.
40. **School Involvement** – Detailed description of amount of involvement in specific school activities within the child's scheduled school day.
41. **School Refusal/Truancy** – Reluctance or refusal to attend school without adult permission for the absence. May be associated with school phobia or fear manifested by frequent somatic complaints associated with attending school or in anticipation of school attendance, or willful avoidance of school in the interest of pursuing other activities.
42. **Self-Injurious Behavior** – Acts of harm, violence, or aggression directed at oneself.
43. **Self-Management/Self-Control** – Issues related to management, regulation, and monitoring of one's own behavior.
44. **Sexual Misconduct** – Issues related with sexual conduct that is defined as inappropriate by the youth's social environment or that includes intrusion upon or violation of the rights of others.
45. **Shyness** – Social isolation and/or excessive involvement in isolated activities. Extremely limited or no close friendships outside the immediate family members. Excessive shrinking or avoidance of contact with unfamiliar people.
46. **Sleep Disturbance** – Difficulty getting to or maintaining sleep.
47. **Social Skills** – Skills for managing interpersonal interactions successfully. Can include body language, verbal tone, assertiveness, and listening skills, among other areas.
48. **Speech and Language Problems** – Expressive and/or receptive language abilities substantially below expected levels as measured by standardized tests.
49. **Substance Abuse/Substance Use** – Issues related to the use or misuse of a common, prescribed, or illicit substances for altering mental or emotional experience or functioning.
50. **Suicidality** – Issues related to recurrent thoughts, gestures, or attempts to end one's life.
51. **Traumatic Stress** – Issues related to the experience or witnessing of life events involving actual or threatened death or serious injury to which the youth responded with intense fear, helplessness, or horror.
52. **Treatment Engagement –** The degree to which a family or youth is interested and optimistic about an intervention or plan, such that they act willfully to participate and work toward the success of the plan.
53. **Willful Misconduct/Delinquency** – Persistent failure to comply with rules or expectations in the home, school, or community. Excessive fighting, intimidation of others, cruelty or violence toward people or animals, and/or destruction of property.

Progress Ratings

Please provide a single progress rating for each target selected above (up to 10). Numbers 1 through 10 in the left column refer to the targets selected in the Targets Addressed This Month section above. For example, had you selected "Academic Achievement" above, there would be a "1" in the box to the left of that target on that section. Then, the first row of the Progress Ratings, labeled "1," is where you would note the progress ratings associated with academic achievement.

Please place a mark (X, ✔) in the column corresponding to your subjective rating of progress associated with this target. When possible, your overall subjective ratings should be informed by

a review of objective measures such as any available and relevant questionnaires or behavioral observation data. For example, if a youth receives a T-score of 70 during an intake assessment and the treatment goal is to reduce this score to 60, then if a youth receives a T-score of 65 during a monthly assessment, than 50% progress may be reported [i.e., 70 – 65 / 70 – 60 = 5 / 10 = 50%]. Or if a youth gets into 10 fights per week initially and the treatment goal is to reduce fighting to 0 fights per week, then during a month in which the youth was fighting only 3 times per week, that would reflect 70% progress [i.e., 10 – 3 / 10 – 0 = 7 / 10 = 70%].

Anchors refer to changes from baseline or beginning of services for that target. Thus, a youth who had reached 90% of an initial goal would receive a rating of "significant improvement." If that progress were to decline to 70% in the following month, the youth would then get a rating of "moderate improvement" for that target for that month (not "deterioration"). "Deterioration" refers to when a target gets worse from the time it was initially addressed. If there is a break in addressing a specific target (e.g., a target is addressed, then not addressed for a month, then addressed again in a later month), use the initial baseline from the first time as the point of comparison. Only when there is a break in the complete episode of care (i.e., discharge followed by later admission), should that reset the baseline for a given target.

If a goal is reached (improvement is complete), the provider may choose to note the date in the rightmost column. This implies that the target is no longer being addressed. Targets that are not complete should be rated again on the following month's summary form.

Intervention Strategies

Please place a mark (X, ✔) to the left of any intervention strategies used during the past month. There is no limit to how many may be checked. If strategies were employed that are not in the following list of definitions, please mark the "other" box and write in the strategy used.

Definitions of Intervention Strategies

1. **Activity Scheduling** – The assignment or request that a child participate in specific activities outside of therapy time, with the goal of promoting or maintaining involvement in satisfying and enriching experiences.
2. **Assertiveness Training** – Exercises or techniques designed to promote the child's ability to be assertive with others, usually involving rehearsal of assertive interactions.
3. **Attending** – Exercises involving the youth and caregiver playing together in a specific manner to facilitate their improved verbal communication and nonverbal interaction. Can involve the caregiver's imitation and participation in the youth's activity, as well as parent-directed play (previously called "Directed Play").
4. **Behavioral Contracting** – Development of a formal agreement specifying rules, consequences, and a commitment by the youth and relevant others to honor the content of the agreement.
5. **Biofeedback/ Neurofeedback** – Strategies to provide information about physiological activity that is typically below the threshold of perception, often involving the use of specialized equipment.

6. **Care Coordination** – Coordinating among the youth's service providers to ensure effective communication, receipt of appropriate services, adequate housing, etc.
7. **Catharsis** – Strategies designed to bring about the release of intense emotions, with the intent to develop mastery of affect and conflict.
8. **Cognitive** – Any techniques designed to alter interpretation of events through examination of the child's reported thoughts, typically through the generation and rehearsal of alternative counter-statements. This can sometimes be accompanied by exercises designed to comparatively test the validity of the original thoughts and the alternative thoughts through the gathering or review of relevant information.
9. **Commands** – Training for caregivers in how to give directions and commands in such a manner as to increase the likelihood of child compliance.
10. **Communication Skills** – Training for youth or caregivers in how to communicate more effectively with others to increase consistency and minimize stress. Can include a variety of specific communication strategies (e.g., active listening, "I" statements).
11. **Crisis Management** – Immediate problem solving approaches to handle urgent or dangerous events. This might involve defusing an escalating pattern of behavior and emotions either in person or by telephone, and is typically accompanied by debriefing and follow-up planning.
12. **Cultural Training** – Education or interaction with culturally important values, rituals, or sites with no specific practices identified.
13. **Discrete Trial Training** – A method of teaching involving breaking a task into many small steps and rehearsing these steps repeatedly with prompts and a high rate of reinforcement.
14. **Educational Support** – Exercises designed to assist the child with specific academic problems, such as homework or study skills. This includes tutoring.
15. **Emotional Processing** – A program based on an information processing model of emotion that requires activation of emotional memories in conjunction with new and incompatible information about those memories.
16. **Exposure** – Techniques or exercises that involve direct or imagined experience with a target stimulus, whether performed gradually or suddenly, and with or without the therapist's elaboration or intensification of the meaning of the stimulus.
17. **Eye Movement/ Tapping** – A method in which the youth is guided through a procedure to access and resolve troubling experiences and emotions, while being exposed to a therapeutic visual or tactile stimulus designed to facilitate bilateral brain activity.
18. **Family Engagement** – The use of skills and strategies to facilitate family or child's positive interest in participation in an intervention.
19. **Family Therapy** – A set of approaches designed to shift patterns of relationships and interactions within a family, typically involving interaction and exercises with the youth, the caregivers, and sometimes siblings.
20. **Free Association** – Technique for probing the unconscious in which a person recites a running commentary of thoughts and feelings as they occur.
21. **Functional Analysis** – Arrangement of antecedents and consequences based on a functional understanding of a youth's behavior. This goes beyond straightforward application of other behavioral techniques.
22. **Goal Setting** – Setting specific goals and developing commitment from youth or family to attempt to achieve those goals (e.g., academic, career, etc.).

23. **Guided Imagery** – Visualization or guided imaginal techniques for the purpose of mental rehearsal of successful performance. Guided imagery for the purpose of physical relaxation (e.g., picturing calm scenery) is not coded here, but rather coded under relaxation (#50).
24. **Hypnosis** – The induction of a trance-like mental state achieved through suggestion.
25. **Ignoring/Differential Reinforcement of Other Behavior** – The training of parents or others involved in the social ecology of the child to selectively ignore mild target behaviors and selectively attend to alternative behaviors.
26. **Individual Therapy for Caregiver –** Any therapy designed directly to target individual (non-dyadic) psychopathology in one or more of the youth's caregivers. If the therapy for caregivers involves marital therapy (#31) or communication skills (#10) those are not coded here, unless there are additional services for individual caregiver psychopathology, in which case all that apply should be coded.
27. **Insight Building** – Activity designed to help a youth achieve greater self-understanding.
28. **Interpretation** – Reflective discussion or listening exercises with the child designed to yield therapeutic interpretations. This does not involve targeting specific thoughts and their alternatives, which would be coded as cognitive/coping.
29. **Line of Sight Supervision** – Direct observation of a youth for the purpose of assuring safe and appropriate behavior.
30. **Maintenance/Relapse Prevention** – Exercises and training designed to consolidate skills already developed and to anticipate future challenges, with the overall goal to minimize the chance that gains will be lost in the future
31. **Marital Therapy** – Techniques used to improve the quality of the relationship between caregivers.
32. **Medication/ Pharmacotherapy** – Any use of psychotropic medication to manage emotional, behavioral, or psychiatric symptoms.
33. **Mentoring** – Pairing with a more senior and experienced individual who serves as a positive role model for the identified youth.
34. **Milieu Therapy** – A therapeutic approach in residential settings that involves making the environment itself part of the therapeutic program. Often involves a system of privileges and restrictions such as a token or point system.
35. **Mindfulness** – Exercises designed to facilitate present-focused, non-evaluative observation of experiences as they occur, with a strong emphasis of being "in the moment." This can involve the youth's conscious observation of feelings, thoughts, or situations.
36. **Modeling –** Demonstration of a desired behavior by a therapist, confederates, peers, or other actors to promote the imitation and subsequent performance of that behavior by the identified youth.
37. **Motivational Interviewing** – Exercises designed to increase readiness to participate in additional therapeutic activity or programs. These can involve cost-benefit analysis, persuasion, or a variety of other approaches.
38. **Natural and Logical Consequences** – Training for parents or teachers in (a) allowing youth to experience the negative consequences of poor decisions or unwanted behaviors, or (b) delivering consequences in a manner that is appropriate for the behavior performed by the youth.

39. **Parent Coping** – Exercises or strategies designed to enhance caregivers' ability to deal with stressful situations, inclusive of formal interventions targeting one or more caregiver.
40. **Parent/Teacher Monitoring** – The repeated measurement of some target index by the parent, teacher, or other adult involved in the child's social ecology.
41. **Parent/Teacher Praise** – The training of parents, teachers, or other adults involved in the social ecology of the child in the administration of social rewards to promote desired behaviors. This can involve praise, encouragement, affection, or physical proximity.
42. **Peer Pairing** – Pairing with another youth of same or similar age to allow for reciprocal learning or skills practice.
43. **Personal Safety Skills** – Training for the youth in how to maintain personal safety of one's physical self. This can include education about attending to one's sense of danger, body ownership issues (e.g., "good touch-bad touch"), risks involved with keeping secrets, how to ask for help when feeling unsafe, and identification of other high-risk situations for abuse.
44. **Physical Exercise –** The engagement of the youth in energetic physical movements to promote strength or endurance or both. Examples can include running, swimming, weight-lifting, karate, soccer, etc. Note that when the focus of the physical exercise is also to produce talents or competence and not just physical activity and conditioning, the code for "Skill Building" (#55) can also be applied.
45. **Play Therapy** – The use of play as a primary strategy in therapeutic activities. This may include the use of play as a strategy for clinical interpretation. Different from Attending (#3), which involves a specific focus on modifying parent-child communication. This is also different from play designed specifically to build relationship quality (#49).
46. **Problem Solving** – Techniques, discussions, or activities designed to bring about solutions to targeted problems, usually with the intention of imparting a skill for how to approach and solve future problems in a similar manner.
47. **Psychoeducational-Child** – The formal review of information with the child about the development of a problem and its relation to a proposed intervention.
48. **Psychoeducational-Parent** – The formal review of information with the caregiver(s) about the development of the child's problem and its relation to a proposed intervention. This often involves an emphasis on the caregiver's role in either or both.
49. **Relationship/Rapport Building** – Strategies in which the immediate aim is to increase the quality of the relationship between the youth and the therapist. Can include play, talking, games, or other activities.
50. **Relaxation** – Techniques or exercises designed to induce physiological calming, including muscle relaxation, breathing exercises, meditation, and similar activities. Guided imagery exclusively for the purpose of physical relaxation is also coded here.
51. **Response Cost** – Training parents or teachers how to use a point or token system in which negative behaviors result in the loss of points or tokens for the youth.
52. **Response Prevention** – Explicit prevention of a maladaptive behavior that typically occurs habitually or in response to emotional or physical discomfort.
53. **Self-Monitoring** – The repeated measurement of some target index by the child.
54. **Self-Reward/Self-Praise** – Techniques designed to encourage the youth to self-administer positive consequences contingent on performance of target behaviors.

55. **Skill Building** – The practice or assignment to practice or participate in activities with the intention of building and promoting talents and competencies.
56. **Social Skills Training** – Providing information and feedback to improve interpersonal verbal and non-verbal functioning, which may include direct rehearsal of the skills. If this is paired with peer pairing (#42), that should be coded as well.
57. **Stimulus/Antecedent Control** – Strategies to identify specific triggers for problem behaviors and to alter or eliminate those triggers in order to reduce or eliminate the behavior.
58. **Supportive Listening** – Reflective discussion with the child designed to demonstrate warmth, empathy, and positive regard, without suggesting solutions or alternative interpretations.
59. **Tangible Rewards** – The training of parents or others involved in the social ecology of the child in the administration of tangible rewards to promote desired behaviors. This can involve tokens, charts, or record keeping, in addition to first-order reinforcers.
60. **Therapist Praise/Rewards** – The administration of tangible (i.e., rewards) or social (e.g., praise) reinforcers by the therapist.
61. **Thought Field Therapy** – Techniques involving the tapping of various parts of the body in particular sequences or "algorithms" in order to correct unbalanced energies, known as thought fields.
62. **Time Out** – The training of or the direct use of a technique involving removing the youth from all reinforcement for a specified period of time following the performance of an identified, unwanted behavior.
63. **Twelve-Step Program** – Any programs that involve the twelve-step model for gaining control over problem behavior, most typically in the context of alcohol and substance use, but can be used to target other behaviors as well.

For medication interventions please list each psychiatric medication the youth is taking (e.g., Adderall ER), describe the prescribed total daily dose for each medication (e.g., 30 mg,), identify the prescribed dose schedule (e.g., 2x/week, 3x/day, 15-10-5/day, etc.), place a check mark in the appropriate box if there was a change in the medication or regimen during the reporting month, and provide a description of the change on the line to the right (e.g., new medication, daily dosage change from 10 to 30 mg, change in dose schedule from 5-5/day to 10-10-10/day, etc.).

For Projected End Date, please indicate the expected date for termination of the services for which this form was completed.

For Discharged During Month please indicate if the youth was discharged from your program during the reporting month. If the youth was discharged, please indicate the Living Situation that the youth was entering upon discharge and the Reason for Discharge. For Projected End Date, please indicate the expected date for termination of the services for which this form was completed.

CAMHD Provider Monthly Summary Instructions and Codebook

Living Situation upon Discharge

Please place a mark (X, ✔) to the left of statement that best describes the type of living environment in which the youth was expected to reside at the time of discharge. Please select only one option. If the youth's living situation at discharge is not well described by the following list of definitions, please mark the "other" box and write in the youth's living situation.

1. **Home** - Youth to live in a house, apartment, trailer, hotel, dorm, barrack, and/or single room occupancy. This excludes situations better characterized as foster homes.
2. **Foster Home**-Youth to reside in a foster home or therapeutic foster home. A foster home is a home that is licensed to provide foster care to children, adolescents, and/or adults.
3. **Group Care**-Youth to reside in a group care facility. This level of care may include a group home, therapeutic group home, or board and care. This excludes community-based residential and hospital-based residential care
4. **Residential Treatment**- Youth to reside in a community-based residential treatment, rehabilitation center, or other residential treatment that is not better characterized as a group home or institution/hospital facility. An organization, not licensed as a psychiatric hospital, whose primary purpose is the provision of individually planned programs of mental health treatment services in conjunction with residential care for children and youth. The services are provided in facilities that are certified by state or federal agencies or through a national accrediting agency.
5. **Institutional/Hospital**-Youth resides in an institutional care or hospital-based residential care facility with care provided on a 24 hour, 7 day a week basis. This level of care may include a skilled nursing/intermediate care facility, nursing homes, institutes of mental disease, inpatient psychiatric hospital, psychiatric health facility, Veterans Affairs hospital, or state hospital.
6. **Jail/Correctional Facility**-Youth resides in a Jail and/or Correctional facility with care provided on a 24 hour, 7 day a week basis. This level of care may include a jail, correctional facility, detention centers, prison, youth authority facility, juvenile hall, boot camp, or boys ranch.
7. **Homeless/Shelter**- A youth is considered homeless if s/he lacks a fixed, regular, and adequate nighttime residence or his/her primary nighttime residency is a supervised publicly or privately operated shelter designed to provide temporary living accommodations, an institution that provides a temporary residence for individuals intended to be institutionalized, or a public or private place not designed for, or ordinarily used as, a regular sleeping accommodation for human beings (e.g., on the street). Youth who were discharged due to extended runaway or elopement episode should be recorded in this category.

Reason(s) for Discharge

Please place a mark (X, ✔) to the left of each statement that describes the reasons for discharging youth from the program during the reporting month. There is no limit to how many may be checked. If the discharge reason is not well characterized by the following list of definitions, please mark the "other" box and write in the reason.

CAMHD Provider Monthly Summary Instructions and Codebook

1. **Success/Goals Met**-Youth was clinically discharged due to sufficient treatment progress (e.g., symptoms reduced, functioning improved), treatment goals were met, youth was evaluated and services were determined unnecessary, services were completed, or youth was moving to a less restrictive and intensive level of care.
2. **Insufficient Progress**-Youth was discharged from service without showing sufficient treatment progress to be judged as clinically successful (i.e., little symptom reduction, improvement in functioning, or goal attainment was achieved).
3. **Family Relocation**-Youth was discharge because the youth and family moved out of state or out of the service area.
4. **Runaway/Elopement**-Youth was discharged in association with an extended period of unavailability for treatment because the youth had runaway from home or eloped from the program.
5. **Refuse/Withdraw**-Youth was discharged due to parental refusal, non-participation in treatment, lack of consent, or other indication that client withdrew from services against professional advice.
6. **Eligibility Change**-Youth was discharged in association with a change in eligibility for services, such as a termination of a court order or commitment, aging out of child and adolescent services, loss of Medicaid insurance, etc.

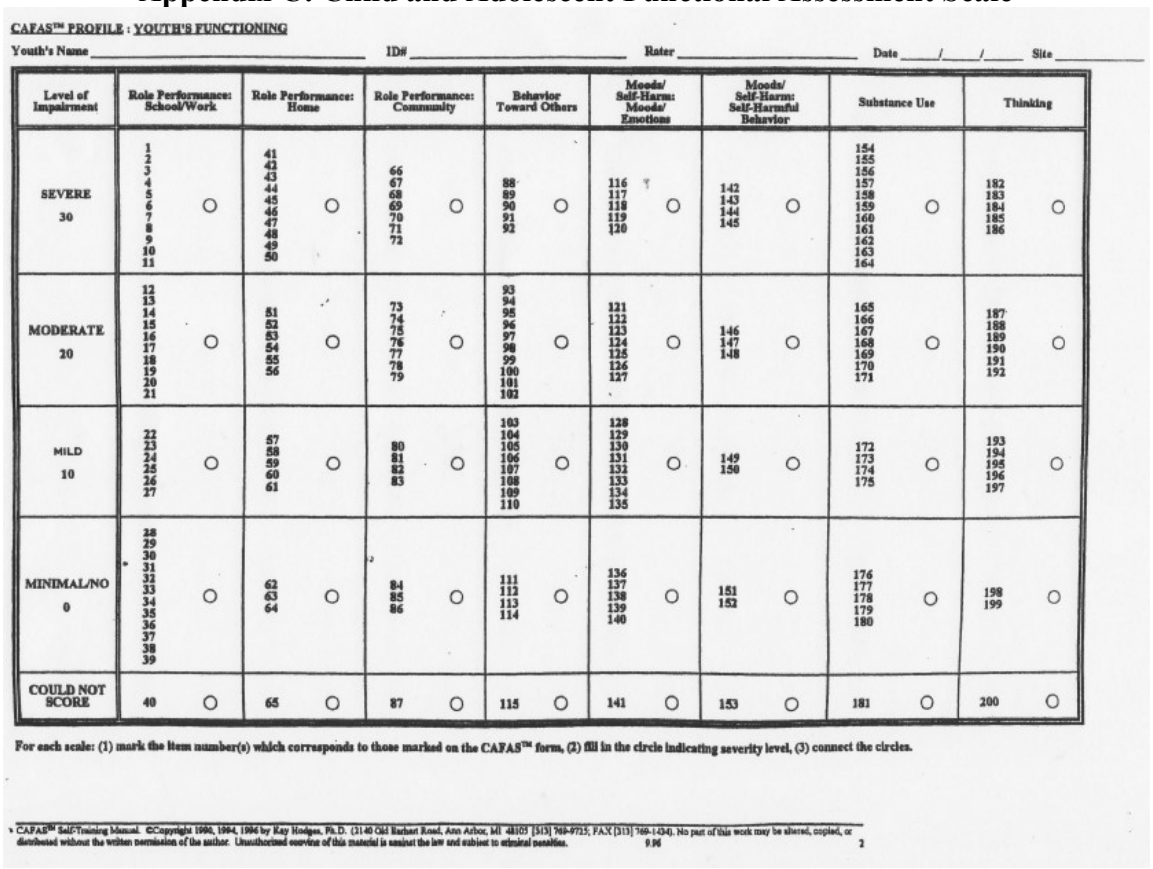
Please provide any other Comments or Suggestions for the youth's care coordinator you think would be important.

If scores are available on any of the Outcome Measures recommended in the Interagency Practice Guidelines, please provide them along with dates in the optional section provided. Include whether or not youth was arrested during the past month, and an estimate of the percentage of school days that were attended. If school is attended in a residential setting, this counts toward the percentage of days attended.

For the CAFAS, the numbered spaces refer to the following scales: 1-School, 2-Home, 3-Community, 4-Behavior Towards Others, 5-Moods/Emotions, 6-Self-Harm, 7-Substance, 8-Thinking. "Total" refers to the sum of these 8 scales.

Please write the name of the agency including location (e.g., Maui, Big Island) and name of the clinicians (along with CAMHMIS ID#) and provider, along with appropriate signatures of the clinician completing the form and the qualified supervisor. Note the date that the form was submitted electronically to CAMHD and provide name of Care Coordinator.

Appendix C: Child and Adolescent Functional Assessment Scale



CAFAS™ PROFILE : YOUTH'S FUNCTIONING

Youth's Name _____ ID# _____ Rater _____ Date ____/____/____ Site _____

Level of Impairment	Role Performance: School/Work	Role Performance: Home	Role Performance: Community	Behavior Toward Others	Moods/ Self-Harm: Moods/ Emotions	Moods/ Self-Harm: Self-Harmful Behavior	Substance Use	Thinking
SEVERE 30	1 2 3 4 5 6 7 8 9 10 11 ○	41 42 43 44 45 46 47 48 49 50 ○	66 67 68 69 70 71 72 ○	88 89 90 91 92 ○	116 117 118 119 120 ○	142 143 144 145 ○	154 155 156 157 158 159 160 161 162 163 164 ○	182 183 184 185 186 ○
MODERATE 20	12 13 14 15 16 17 18 19 20 21 ○	51 52 53 54 55 56 ○	73 74 75 76 77 78 79 ○	93 94 95 96 97 98 99 100 101 102 ○	121 122 123 124 125 126 127 ○	146 147 148 ○	165 166 167 168 169 170 171 ○	187 188 189 190 191 192 ○
MILD 10	22 23 24 25 26 27 ○	57 58 59 60 61 ○	80 81 82 83 ○	103 104 105 106 107 108 109 110 ○	128 129 130 131 132 133 134 135 ○	149 150 ○	172 173 174 175 ○	193 194 195 196 197 ○
MINIMAL/NO 0	28 29 30 31 32 33 34 35 36 37 38 39 ○	62 63 64 ○	84 85 86 ○	111 112 113 114 ○	136 137 138 139 140 ○	151 152 ○	176 177 178 179 180 ○	198 199 ○
COULD NOT SCORE	40 ○	65 ○	87 ○	115 ○	141 ○	153 ○	181 ○	200 ○

For each scale: (1) mark the item number(s) which corresponds to those marked on the CAFAS™ form, (2) fill in the circle indicating severity level, (3) connect the circles.

Appendix D: Child and Adolescent Mental Health Division Notice of Privacy Practices

Notice of Privacy Practices
Child and Adolescent Mental Health Division
("CAMHD")

THIS NOTICE DESCRIBES HOW MEDICAL INFORMATION ABOUT YOUR CHILD MAY BE USED AND DISCLOSED. IT ALSO EXPLAINS HOW YOU CAN GET ACCESS TO THIS INFORMATION. PLEASE REVIEW IT CAREFULLY.

Understanding Your Child's Protected Health Information:

CAMHD staff and doctors take notes each time your child visits them. They write down what they think is your child's condition and how they plan to care for them. Your child's health record has information that can identify him or her. This kind of information is known as "Protected Health Information" (PHI). Your child's name and Social Security number are types of PHI.

If you know what is in the health record you can better protect your child's Protected Health Information. You can also ask how PHI will be used. You can decide if PHI should be disclosed. You can make sure that the health record is accurate.

Our Duties:

CAMHD must:

- Protect the privacy of PHI.
- Tell you about our legal duties.
- Tell you about our privacy practices. You have the right to know how CAMHD uses and discloses PHI.
- Abide by this notice.
- Give you a copy of this notice, even if you agreed to get it electronically.
- Notify you when your child's information has been breached.

CAMHD can change its privacy practices at any time. We will mail you a copy of any new notice within sixty days.

CAMHD will ask for your authorization before disclosing PHI. CAMHD can disclose PHI without your permission. However, any release of PHI will follow the law, as explained in this notice.

Effective September 23, 2013

Your Child's Health Information Rights:

CAMHD owns your child's health record. However, the information in the record belongs to your child. On behalf of your child, you have the right to:

- View or get paper copies of PHI upon written request.
- Decide how we send PHI to you. For example, CAMHD usually sends information by mail. You may ask to get PHI by other means, such as fax. You may also ask us to send PHI to another address.
- Ask to limit the use and disclosure of PHI. CAMHD is not required by law to agree to every request.
- Ask for corrections to your child's health record.
- Get an accounting of PHI disclosures.
- Change your mind about allowing use or disclosures of PHI. This does not apply to disclosures that have already happened.
- Ask for confidential communications. CAMHD must accommodate reasonable requests.
- Restrict disclosure of your child's health information to a health plan for services you have paid for out of pocket and in full.

Information that does not identify your child is used in:

- Medical and mental health research.
- Planning and improving services.
- Improving health care.

Examples of Disclosures for Treatment, Payment, and Health Care Operations:

CAMHD sometimes has to share PHI with other agencies to provide services. CAMHD will only share the minimum necessary PHI with them. We will also require them to protect the PHI they receive.

Treatment. For example: A CAMHD professional notes your child's and the treatment team's expectations in the health record. A doctor logs the actions taken and his or her observations.

If it is necessary for the continued care and treatment of your child, CAMHD may release your child's treatment summary for services received during the previous five (5) year period to another health care provider without your permission. However, the health care provider who wants this information must first make a reasonable effort to obtain your authorization.

Payment. For example: A provider sends a bill to CAMHD. The bill or accompanying materials may contain PHI, which requires your authorization.

Before we send a bill with your information or your child's information to a third party payor, you have the option to authorize us to release this PHI or pay for the services yourself. If you do not pay, CAMHD may send the bill along with any necessary PHI without your authorization.

Regular Health Operations. For example: CAMHD staff uses PHI to evaluate treatment outcomes. This helps CAMHD to improve our services.

With your Authorization:

We will ask for your written permission to use and/or disclose your child's information for the following purposes:

- Marketing;
- What may constitute the sale of your PHI;
- Psychotherapy notes (if we maintain psychotherapy notes) and;
- Other uses and disclosures not described in this Notice.

Uses and Disclosures (Permission not Needed):

CAMHD may disclose PHI without your permission. But any release of PHI will follow the law as explained below.

- **For judicial and administrative purposes.** CAMHD must disclose your child's PHI to a court when it is ordered by the court to do so, when it is necessary for the court to hear a legal action, and when failure to make the disclosure would be against public interest.
- **In the event of an emergency.** CAMHD may share your child's PHI when there is an emergency that requires an immediate sharing of information.
- **If there is a serious danger of threat or violence.** CAMHD may share your health information if it determines, in its best professional judgment, that there exists a serious danger or threat of violence toward another person. CAMHD will exercise its duty to exercise reasonable care to protect foreseeable victims.
- **If requested by the United States Department of Health and Human Services (DHHS) Secretary.** If required by the DHHS Secretary, CAMHD must disclose PHI for investigatory or monitoring purposes.

- **To comply with federal or State laws.** CAMHD may disclose PHI when the law requires it. CAMHD will only share what is necessary in order to comply with the law.

- **Report suspected abuse or neglect to appropriate Public Health and Law Enforcement authorities.** For example: should CAMHD suspect or receive a report of abuse or neglect of a minor at the hands of a parent, foster parent, family member, guardian or provider, CAMHD will report the suspected abuse or neglect to the necessary authorities, e.g., Child Protective Services, Police, etc. Some of the information that we report may contain limited health information about you.

- **Carry out Hawaii State mental health laws, as found in Hawaii Revised Statutes Chapter 334 and Hawaii Administrative Rules 11-175-31.** Your health information may be shared if the Director of Health feels it is necessary.

- **Comply with the Federal Protection and Advocacy for Mentally Ill Individuals Act of 1986.** To protect and advocate the rights of persons with mental illness who reside in facilities providing treatment or care.

- **Other Types of PHI.** There are stricter requirements for use and disclosure for some types of PHI. For example, mental health, drug and alcohol abuse, and human immunodeficiency virus (HIV)/ acquired immunodeficiency syndrome (AIDS) patient information. However, there are still limited circumstances in which these types of information may be used or shared without your authorization.

Family Educational Rights and Privacy Act (FERPA)

Your child's records may also be considered "education records." CAMHD will only disclose information in your child's education records as allowed by FERPA regulations. The Department of Education provides you with your child's FERPA notice of privacy practice.

For More Information or to Report a Problem:

If you need more information or want to file a privacy complaint, contact the CAMHD Privacy Coordinator:

CAMHD Privacy Coordinator
3627 Kilauea Avenue, Suite 404
Honolulu, HI 96816
(808) 733-4198

You may also call the Department of Health Privacy Officer at (808) 586-4____.

You can also file a privacy complaint with the U.S. Department of Health and Human Services. You may contact them at:

Office of Civil Rights
U.S. Department of Health and Human Services
90 7th Street Suite 4-100
San Francisco, California 94103
Phone: (415) 437-8310; (415) 437-8311 (TDD)
FAX: (415) 437-8329
E-mail: www.hhs.gov/ocr

No one will face retaliation for filing a complaint.

My signature below indicates that I have been provided with a copy of the notice of privacy practices.

Name: _____ Child's Name: _____

Signature: _____ Signature: _____

Date: _____ Date: _____

Relationship to child:

Distribution: Original to CAMHD
Copy to Parent/Guardian.

Effective Date: April 14, 2003
Revision Dates: 6/03; 11/07; 7/09; 9/13

Effective September 23, 2013

Appendix E: Youth and Demographic Clinical Information by Region and Total Sample

Youth demographic and clinical information by region and total sample (N = 636)

Variable	Kaua‘i	Maui	Hawai‘i	Honolulu	Central/ Windward	Leeward	Total Sample
Sample Size[a]	18 (2.8%)	66 (10.4%)	192 (30.3%)	92 (14.5%)	144 (22.87%)	122 (19.2%)	634 (100.0%)
Age	16.2	15.5	16.2	16.1	16.0	15.9	16.00 (1.35)
Gender (Male)[a]	12 (66.7%)	32 (48.5%)	118 (61.5%)	71 (77.2%)	94 (65.3%)	86 (70.5%)	413 (65.1%)
Length of IIH Episode (days)[b]	166.5	166.5	183.0	265.5	256.5	295.0	219.00
Race[a]	--	--	--	--	--	--	--
Asian	0 (0.0%)	7 (10.6%)	7 (3.6%)	16 (17.4%)	9 (6.3%)	14 (11.5%)	53 (8.4%)
Black	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	1 (0.7%)	1 (0.8%)	3 (0.5%)
Multiracial	8 (44.4%)	35 (53.0%)	123 (63.7%)	31 (33.7%)	101 (70.1%)	74 (60.7%)	371 (58.5%)
Native Hawaiian or Other Pacific Islander	4 (22.2%)	5 (7.6%)	18 (9.4%)	31 (33.7%)	14 (9.7%)	19 (15.6%)	91 (14.4%)
White	4 (22.2%)	10 (15.2%)	31 (16.1%)	12 (13.0%)	11 (7.6%)	6 (4.9%)	74 (11.7%)
Other	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	1 (0.7%)	1 (0.8%)	3 (0.5%)
Not Available	2 (11.1%)	9 (13.6%)	13 (6.8%)	1 (1.1%)	7 (4.9%)	7 (5.7%)	39 (6.2%)
Primary Diagnosis[a]	--	--	--	--	--	--	--
Adjustment	1 (5.6%)	7 (10.6%)	16 (8.3%)	6 (6.5%)	3 (2.1%)	6 (4.9%)	39 (6.2%)
Anxiety	1 (5.6%)	5 (7.6%)	14 (7.3%)	10 (10.9%)	6 (4.2%)	5 (4.1%)	41 (6.5%)
Attentional	4 (22.2%)	14 (21.2%)	16 (8.3%)	8 (8.7%)	10 (6.9%)	4 (3.3%)	56 (8.8%)
Deferred	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	0 (0.0%)	1 (0.2%)
Disruptive Behavior	3 (16.7%)	8 (12.1%)	87 (45.3%)	36 (39.1%)	60 (41.4%)	65 (53.3%)	259 (40.9%)
Intellectual Disability	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
Miscellaneous	2 (11.1%)	1 (1.5%)	4 (2.1%)	1 (1.1%)	1 (0.7%)	2 (1.6%)	11 (1.7%)
Mood	2 (11.1%)	19 (28.8%)	37 (19.3%)	22 (23.9%)	39 (27.1%)	24 (19.7%)	143 (22.6%)
Pervasive Developmental	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
Psychotic Spectrum	1 (5.6%)	1 (1.5%)	2 (1.0%)	3 (3.3%)	3 (2.1%)	4 (3.3%)	14 (2.2%)
Substance Related	3 (16.7%)	7 (10.6%)	14 (7.3%)	6 (6.5%)	20 (13.9%)	9 (7.4%)	59 (9.3%)
Missing	1 (5.6%)	4 (6.1%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	3 (2.5%)	9 (1.4%)
Any Diagnosis Present[a]	--	--	--	--	--	--	--
Adjustment	3 (16.7%)	9 (13.6%)	23 (12.0%)	9 (9.8%)	5 (3.5%)	9 (7.4%)	58 (9.1%)
Anxiety	2 (11.1%)	13 (19.7%)	24 (12.5%)	15 (16.3%)	17 (11.8%)	13 (10.7%)	84 (13.2%)
Attentional	7 (38.9%)	20 (30.3%)	41 (21.4%)	18 (19.6%)	39 (27.1%)	18 (14.8%)	143 (22.6%)
Deferred	2 (11.1%)	14 (21.2%)	57 (29.7%)	10 (10.9%)	38 (26.4%)	36 (29.5%)	157 (24.8%)
Disruptive Behavior	8 (44.4%)	20 (30.3%)	120 (62.5%)	58 (61.2%)	92 (63.9%)	82 (67.2%)	380 (59.9%)

Intellectual Disability	0 (0.0%)	0 (0.0%)	6 (3.1%)	0 (0.0%)	1 (0.7%)	2 (1.6%)	9 (1.4%)
Miscellaneous	4 (22.2%)	5 (7.6%)	43 (22.4%)	17 (18.5%)	25 (17.4%)	15 (12.3%)	109 (17.2%)
Mood	4 (22.2%)	26 (39.4%)	69 (35.9%)	34 (37.0%)	58 (40.3%)	33 (27.0%)	224 (35.3%)
Pervasive Developmental	0 (0.0%)	0 (0.0%)	2 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.3%)
Psychotic Spectrum	1 (5.6%)	1 (1.5%)	4 (2.1%)	4 (4.3%)	3 (2.1%)	4 (3.3%)	17 (2.7%)
Substance Related	6 (33.3%)	33 (50.0%)	100 (52.1%)	54 (58.7%)	84 (58.3%)	43 (35.2%)	320 (50.5%)
CAFAS at Episode Start	--	--	--	--	--	--	--
School	17.14 (10.69)	17.33 (10.09)	19.44 (9.83)	22.84 (9.14)	21.25 (10.65)	22.16 (9.19)	20.65 (9.96)
Home	17.86 (9.75)	18.00 (10.14)	18.70 (9.43)	20.00 (7.94)	19.84 (10.15)	20.00 (8.56)	19.33 (9.31)
Community	17.14 (6.11)	8.67 (9.44)	16.27 (8.43)	17.43 (7.95)	14.84 (9.56)	15.10 (8.53)	15.23 (8.94)
Behavior	11.43 (6.63)	13.78 (7.77)	17.27 (6.02)	17.57 (5.69)	14.69 (8.03)	16.76 (6.77)	16.13 (6.97)
Moods	15.71 (7.56)	16.89 (7.33)	15.78 (6.86)	16.22 (7.53)	15.20 (7.75)	15.29 (7.14)	15.70 (7.27)
Self-harm	1.43 (5.35)	4.00 (8.37)	1.61 (5.69)	3.65 (8.21)	2.91 (7.14)	1.96 (6.14)	2.49 (6.80)
Substance use	11.43 (10.27)	11.11 (11.12)	12.30 (10.02)	12.57 (10.61)	13.13 (11.69)	9.31 (10.08)	11.83 (10.67)
Thinking	2.14 (8.02)	1.78 (5.76)	1.55 (4.55)	3.65 (7.51)	1.57 (5.11)	1.27 (4.81)	1.83 (5.47)
Total	94.29 (41.64)	91.56 (36.80)	102.61 (29.34)	114.56 (28.73)	103.03 (39.46)	101.57 (30.07)	103.13 (33.50)
Discharge Situation[a]	--			--			--
Foster Home	4 (22.2%)	4 (6.1%)	12 (6.3%)	3 (3.3%)	5 (3.5%)	3 (2.5%)	31 (4.9%)
Group Care	0 (0.0%)	0 (0.0%)	1 (0.5%)	0 (0.0%)	3 (2.1%)	2 (1.6%)	6 (0.9%)
Home	5 (27.8%)	28 (42.4%)	75 (39.1%)	46 (50.0%)	53 (36.8%)	32 (26.2%)	239 (37.7%)
Homeless/Shelter	0 (0.0%)	0 (0.0%)	3 (1.6%)	0 (0.0%)	1 (0.7%)	1 (0.8%)	5 (0.8%)
Institution/Hospital	0 (0.0%)	2 (3.0%)	1 (0.5%)	0 (0.0%)	3 (2.1%)	2 (1.6%)	8 (1.3%)
Jail/Correctional Facility	1 (5.6%)	1 (1.5%)	7 (3.6%)	3 (3.3%)	7 (4.9%)	2 (1.6%)	21 (3.3%)
Other	0 (0.0%)	4 (6.1%)	18 (9.4%)	6 (6.5%)	12 (8.3%)	11 (9.0%)	51 (8.0%)
Residential Treatment	0 (0.0%)	5 (7.6%)	12 (6.3%)	6 (6.5%)	15 (10.4%)	7 (5.7%)	45 (7.1%)
Missing	7 (38.9%)	22 (33.3%)	55 (28.6%)	28 (30.4%)	46 (31.3)	60 (49.2%)	217 (34.2%)
Discharge Status[a]	--	--	--	--	--	--	--
Success	4 (22.2%)	29 (43.9%)	61 (31.8%)	21 (22.8%)	36 (25.0%)	21 (17.2%)	172 (27.1%)
Insufficient Progress	0 (0.0%)	6 (9.1%)	17 (8.9%)	6 (6.5%)	13 (9.0%)	6 (4.9%)	48 (7.6%)
Family Relocation	1 (5.6%)	0 (0.0%)	3 (1.6%)	1 (1.1%)	2 (1.4%)	1 (0.8%)	8 (1.3%)
Runaway	0 (0.0%)	1 (1.5%)	11 (5.7%)	1 (1.1%)	2 (1.4%)	4 (3.3%)	19 (3.0%)
Refused Treatment	1 (5.6%)	0 (0.0%)	14 (7.3%)	10 (10.9%)	12 (8.3%)	7 (5.7%)	44 (6.9%)
Eligibility Change	1 (5.6%)	0 (0.0%)	7 (3.6%)	9 (9.8%)	8 (5.6%)	6 (4.9%)	31 (4.9%)
Other	3 (16.7%)	9 (13.6%)	30 (15.6%)	19 (20.7%)	32 (22.2%)	19 (15.6%)	112 (17.7%)
Missing	7 (38.9%)	22 (33.3%)	55 (28.6%)	28 (30.4%)	45 (31.3%)	60 (49.2%)	217 (34.2%)

Note. Any Diagnosis Present represents the percent of youth who had a diagnosis in each category anywhere on their diagnostic profile, regardless of order (primary, secondary, tertiary etc.). [a] Represents frequencies and percentages. [b] Represents median. All other variables represent means and standard deviations.

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